

In This Issue—Service Managers Convention

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MOTOR AGE

Volume XXXVIII
Number 21

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CHICAGO, NOVEMBER 18, 1920

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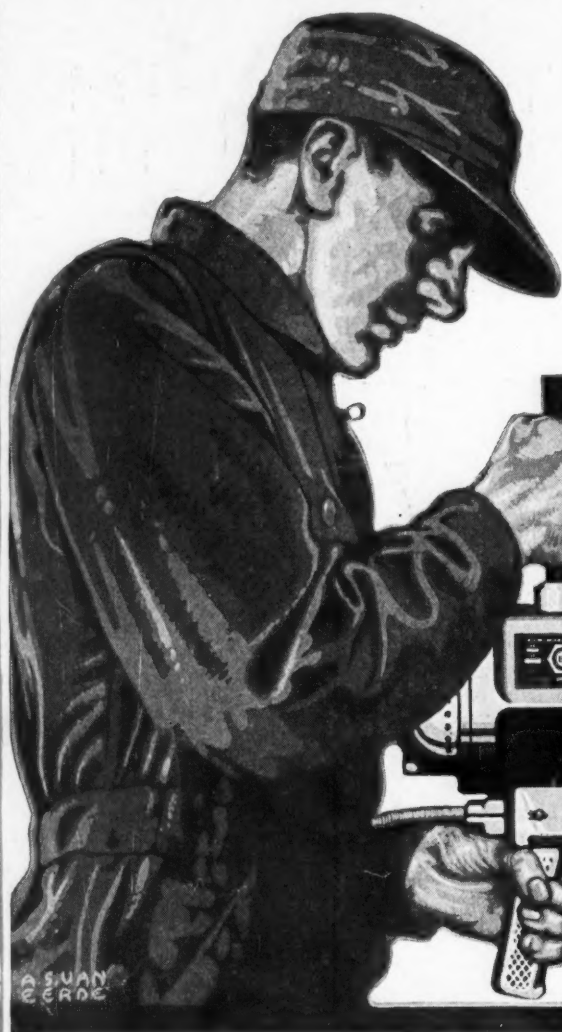
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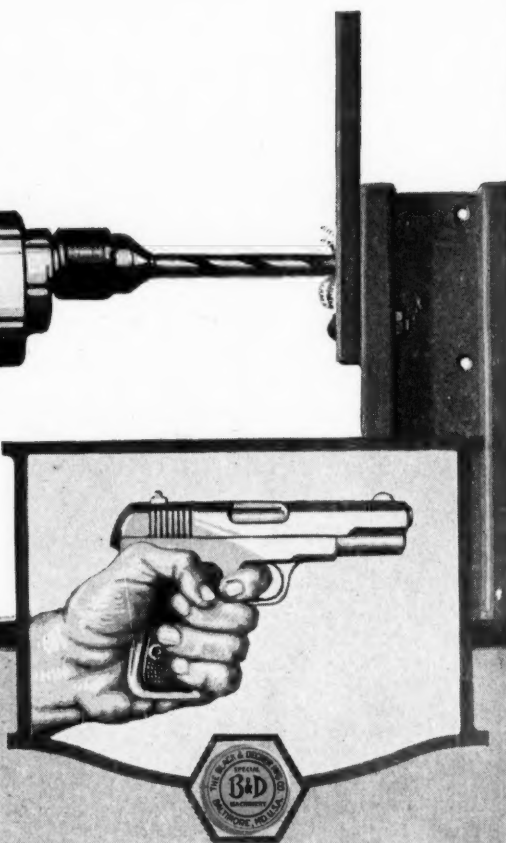
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E. E. HAIGHT, Manager

DAVID BEECROFT, Directing Editor

RAY W. SHERMAN, Executive Editor B. M. IKERT, Editor

BRANCH OFFICES

DETROIT, 95 Fort St., W., Phone Maine 1351

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the Price
of a Four**

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WE FURTHER AGREE to make the rebate to the holder of this bond in actual cash subject to the following conditions:

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MOTORS CORPORATION, MOLINE, ILLINOIS

W. H. Velie President

MOTOR AGE

DEALER'S SERVICE PROBLEMS

Recognized by Factory Service Men

The Keynote of the Factory Service Managers' Convention, held in Cleveland November 9, 10, and 11, was that the importance of the Service Department has been too little appreciated. Greater cooperation between factory and dealer to be striven for in order that owners will be better satisfied. Next meeting to be held in Buffalo, May, 1921

BY ROY E. BERG

CLEVELAND, Nov. 10—That service is a subject too little considered by departments other than service departments; that more consideration of it will produce greater sales; that service rendered with a smile will produce greater harmony in the order of things; that the car buying public ever be remembered as the source of income; that the ever growing menace of the car theft problem is a service problem; these and others were the salient thoughts of the (factory) Service Managers' Convention of the N. A. C. C. held here November 9, 10 and 11 at the Cleveland Hotel at which approximately seventy-five members were present representing about fifty-five companies.

While the chief purpose of the convention was to discuss for general betterment the problems of factory service managers, *it was very noticeable that the dealer came in for his share of the discussion for practically every problem threshed out concerned the dealer in one way or another.*

Service has now become the universal word of the automotive industry. There was a time when cars were easily sold without ever a reference to the service rendered or held in readiness at the owner's first beck and call. Now we are in that period where service clinches the sale. It has become the one factor that spells car owner satisfaction. With or without it an organization succeeds or fails. These are the sentiments which prevailed at the factory Service Managers' Convention, whence it follows that a factory organization imbued with the "Spirit of Service," as Mr. Wells, service manager, Pierce-Arrow so aptly expressed it, must quickly fall in line and extend itself

for the dealer, that he too may carry on with the spirit of service.

Out of the first day's papers came much food for thought, which will undoubtedly create a stimulus for action for the improvement of both motor car and truck service enabling the car buyer and truck buyer to secure a greater degree of satisfaction.

The first day's session was opened by A. B. Cummer, general service manager of the Autocar Sales & Service Co. After attending to the preliminary business, Mr. Cummer introduced George C. Hubbs, vice president Grant Motor Car Corp.

THE IMPORTANCE OF THE SERVICE MANAGER

Mr. Hubbs in his talk impressed those present with the great need for more pleasant and courteous treatment to the public, which is after all the meal ticket of the automotive industry. What follows is a digest of the sense of Mr. Hubbs' talk:

In the first place, one of the most important men in any automotive organization is the service manager, the man at the point of contact with those whom the factory transacts their business with. When the various automotive establishments begin to appreciate the importance of the service manager and accord him the rank and distinction he is entitled to, the automotive business will be lifted to a new and higher plane which at this time is far beyond our reach.

It is the service manager's business to co-ordinate his forces in such a way as to produce satisfaction and satisfaction only. This may sound trite and commonplace, but when the subject is sufficiently studied the soundness and full importance of the statement may be realized.

For example, one would hardly judge or infer from the finite limitations of the above, that a service manager is in reality

The Service Manager's New Title—

"SERVICE ENGINEER"

an associate sales manager, an assistant engineer or an advertising counsel for the firm and so on ad infinitum. Yet, where are we to find the sales manager who will accord the service manager his proper place? The answer is that the service manager of today is not the man to perform in all these other capacities. The reason is simply because the powers that be have not voted the service manager a large place in the organization. He is a bigger man than deemed now.

Who would think of the service manager as an assistant engineer? Yet, he is exactly that. Does he not have to dictate the manner of repairs for certain breaks that the engineer who designed the car never dreamed of happening? Is he not at the strategic observation point to witness the performance of the car? Then, why is he not considered sufficiently important to suggest improvements as he has had opportunity of making on the cars already out in the field?

SECRETARY MAKES REPORT

Following Mr. Hubbs' able talk, H. R. Colbeigh, secretary of the service committee of the N. A. C. C. made a report on the progress of the organization made since the last meeting in May held in Indianapolis. It was decided that greater good could be had from the funds of the organization were they devoted to other purposes than paying traveling expenses of the men to the convention. This was considered a wise move and was adopted.

Mr. Colbeigh laid considerable stress on the importance of a medium for the interchange of ideas and the "Service Bulletin," of which he is the author, prepared solely for the benefit of the factory service managers is this medium. Through its pages the service manager may air his ideas and view those of the others. Apparently the men present were well pleased with the bulletin which is a comparatively new thing with them. The only suggestion made for improvements was that personal items relating to changes of personnel be carried in the columns.

E. D. Pugh, chairman of the local committee, next announced the plans arranged for the entertainment of the convention members, in which were included a theatre party, smoker and dinner, and some trips through the automotive factories of Cleveland.

At this point A. B. Cummer, chairman of the Service Managers' Association, interjected a thought of safety-first movements. By having everyone adhere to certain established customs for traffic signals, a general acceptance will be made through the usage. The proposed rules are that a driver signalling with arm extended above the horizontal indicates a turn to the right; extended below the horizontal indicates a left turn and when in the horizontal position a complete stop. It was further said by Mr. Cummer that cars constructed so as to prohibit the driver from giving these signals would be declared illegal for operation on the highways.

What the Factory Service Managers Had to Say About the Dealer's Service

How to Improve Passenger Car Service

BY. G. W. C. BRAITHWAITE

Service Manager, Apperson Bros. Automobile Co., Kokomo, Ind.

"HOW to Improve Passenger Car Service" was the title of a paper presented by G. W. C. Braithwaite, service manager, Apperson Bros. Auto Co. Mr. Braithwaite's paper was confined chiefly to the dealer's establishment wherein he considered an ideal service station. Many passages of Mr. Braithwaite's paper read in such axiomatic fashion, speaking whole volumes, as it were, in each paragraph. The paper was quite lengthy and for lack of space certain passages are quoted in excerpt form.

"The standard of measurement of the ideal service station is the satisfaction of the customers served and the repeat orders resulting."

"Thus defined the IDEAL Service Station becomes one with which the rational patron can find no fault and one in which every customer is satisfied."

"In every service station worthy of the name there must be some one who really understands service and its underlying principles. Without this the station will be a failure. This theorem constitutes the fundamental basis for our ideal Service Station."

"When dealers maintain their prestige, you will find that they thoroughly understand service or have someone in their employ who does."

"The ideal service station must be designed for the purpose; it can not be remodeled out of an old barn or livery stable. Wide entrance and exit, ample storage space, large elevators, convenient rest rooms, clean business-like offices, and well kept up shop and equipment must prevail."

"Our ideal station must have the commoner machine tools such as a lathe, a drill, press, an arbor press, a milling machine and perhaps a planer, a portable drill and such other pieces as the business warrants. It must also contain a full assortment of special tools for the particular make or makes of cars it handles."

"Here again the presence or absence of these tools and their selection, arrangement and upkeep determines whether or not there is a service man in the organization. If the owner understands Service or employs a real service man, there will necessarily be a reason-

ably large assortment of tool equipment in his service station.

"At every step, let me impress it upon you that our fundamental proposition is that Service personnel is behind the Ideal Service Station and none of the essentials of that ideal can be formulated or maintained without a thorough knowledge of Service to carry it through."

"With the building properly arranged for Service and the tool equipment and appurtenances selected, we are headed toward our goal."

"Many a passenger car service station is seriously handicapped by lack of parts and many lose their prestige with their customers by neglecting this detail."

"The Ideal Service station must have an adequate stock of parts to service the cars dependent upon it. This cannot usually be predetermined, but should be regulated by the requirements."

"Another place where service stations fall down is in the handling of their parts. A stock room under lock and key, must be built and the stock put in bins and racks, tagged with model, part number, and any other data required. It should be recorded on bin cards, or stock ledger, for the purpose of controlling the supply and reordering when necessary."

"Before leaving the physical properties of the ideal passenger car service station, I just want to mention the fundamentals



They are Discussing Methods to Improve Service on the Motor Car

The dealer knows these men; they have the important job of seeing that motor cars are properly serviced. The picture above was taken at one of the conferences held during the three-day convention of the Factory Service Managers at Cleveland. Approximately seventy-five members were present representing fifty-five manufacturers

of good service that are most frequently neglected in retail organizations. These are light and cleanliness.

"Light may be natural or artificial but every department must be well lighted. The day of hunting trouble in a dark room with a single carbon drop light is gone. Workmen need good light and lots of it to do good work. Light is cheaper than a customer's dissatisfaction or come backs on repair work.

"On cleanliness, every service man should be a crank. In a service station regular daily cleanups should be demanded and disposal made of all junk, chips, greasy rags and the like. Parts returnable for credit should have a distinctive location and await return to factory for disposal. Tools, and particularly machine tools, should be kept clean. The men who work and their clothing should be kept clean and I would even go so far as to supply the overalls for the men and issue clean suits every day if necessary to exemplify the importance of this.

"Clean covers of all kinds should be kept in stated locations to cover hoods, fenders, radiators, cushions, carpets, seat backs, etc., when customer's cars are being worked on. It should be a penal offense to receive a single complaint from a customer that finger marks, scratches or dirty patches appeared anywhere about his car as the result of work done in the service station."

"The personnel of the Ideal Passenger Car Service Station may be classified as follows:

"First—A real service manager in the broadest sense of the word to watch, control, direct and supervise all service matters.

"Second—A diplomatic, suave, engaging personality to wait on customers, take their orders, ingratiate them and make them feel they are getting the best of attention.

"Third—A thoroughly experienced stock clerk to handle the parts efficiently.

"Fourth—One or more thoroughly competent mechanics.

"In a smaller organization one person might embody two or more of these functions. Larger organizations would demand assistants and under-clerks according to necessity."

Special Tools for the Service Station

BY PAUL WILLIAMS

Service Manager, Franklin Automobile Co., Syracuse

WITH regard to the subject of special tools for service stations, Paul Williams, service manager of the Franklin company had a good deal to say that had a pertinent bearing on the subject. His paper on the subject divided into three main classes all the tools necessary for the service station. The classification Mr. Williams made is as follows:

1—Commercial wrenches. (This includes such wrenches as standard, open end, and pipe wrenches).

2—Specialty tools. (These are made by companies making special automobile tool equipment, such as valve grinders, etc.)

3—Tools required for the particular make of car the distributor is handling.

Most of the complaints against service stations these days is due to what the owner calls an excess labor charge. Assuming that the dealer appreciates good workmanlike tools of the first two classes as described above, the third class tools become the controlling factor with regard to the excess labor charge. Most dealers do appreciate the necessity of good open end wrenches, good monkey wrenches and other small tools but the

number who favor special tools is appreciably less. By having a set of special tools to fit the individual needs of the dealer's cars the problems of excess labor charges will be greatly minimized.

In the discussion of this paper it was brought out that many of the large parts makers made emphatic statements to the effect that their products needed no special tools for dis-assembling and, therefore, the problems of excess labor charges would be reduced by the use of their equipment. It also developed that one tool making company is now devoting individual attention to the car maker's tool problems and that they design sets of special tools for their models.

J. B. Bray led the discussion on factory responsibility in connection with claims on equipment not covered by the factory warranty. This brought up a hot debate, some taking the position that the factory should stand back of everything on the car except the tires, and others inclining to the belief that the accessory service stations were better able to take care of the guarantee service than the local service stations. Several motions

were put and amended and then withdrawn, but no definite action was taken at the time.

C. R. Lester of the Packard Motor Car Co. led the discussion on the advisability of factories advising distributors as to service station layouts. He said that the company had done considerable work in getting up plans and layouts, but that as a rule, the distributors went ahead and laid the buildings out to suit themselves.

Discussion on this paper brought up

the subject of standard tool equipment sent out to the owners with the cars. Bray of the Grant said that the average tools were a joke, that the wrenches would not fit the nuts and that the heads usually came off the hammers the first blow struck. Voyles said that he had had the same experience some time back and had gotten action the same afternoon by exhibiting the tools to all the officers of the company when one of the cars was ready for delivery.

class is so small it has little effect on the information the manufacturer should place in the hands of the majority.

"The parts manufacturers as a whole prefer, I believe, to have troubles with their particular units adjusted by a competent mechanic from the factory or the local service station. This is, of course, is very good but in many cases troubles cannot be handled in this manner.

"My past experiences, personally, as a road service mechanic proved to me that the manufacturer could have saved the expense of a service mechanic in a large number of cases if their instruction book had contained more detailed information. At the same time the owner could have located and corrected such minor trouble, in a short time without waiting the arrival of a factory service man. I might add that any number of owners seriously object to having local mechanics adjust their cars and in many cases I will say, they show good judgment.

"As to the accessory manufacturers, they usually maintain a service station, equipped so as to be in position to render service to the various owners, using their equipment. It would be for the mutual benefit of all concerned if the car manufacturer would advise the accessory manufacturer as to the approximate number of cars to be placed in the various states during a season in order that they could have their various service stations carry an adequate stock of repair parts.

The Ideal Instruction Book

"Referring back to the parts and instructions books I wish to say that my idea of an ideal book is one that incorporates cuts of the individual units with full explanation as to the care and adjustments, also including a spare parts list, giving part numbers, instructions relative to the method of handling C. O. D. shipments and parts for replacement, as well as the proper method of handling parts to be returned for inspection and credit adjustment.

"In closing, might say that I am satisfied that the parts and accessory manufacturers would be more than willing to co-operate with the car manufacturers if they decided on a standard size instruction booklet, so constructed that inserts and corrections could be made from time to time as conditions would warrant.

"I would be pleased to have this proposition considered from all angles and if it is deemed a logical step to take as a body, that this matter be taken up with the various car and parts manufacturers by the Chamber of Commerce.

"If such a plan could be worked out it seems to me that it would result in an economy of effort and at the same time be of mutual benefit to all concerned."

In the discussion of the instruction book question it was decided that a size of 6 by 9 in. is the most desirable and convenient size to employ. J. Howard Pile of Motor World said that in his experience with instruction books he had found many of them to be hopelessly lacking in specific detail and recommended that better illustrations be used in the future.

Better and More Complete Instruction Books

BY F. J. KEENE

National Motor Vehicle Co., Indianapolis

THE problems presented the second day of the meeting were chiefly for discussion, for but two papers were presented. These were Service Ideals by F. J. Wells, and Ways to Shorten Time Trucks Spend in Service Stations, by A. B. Westman, service manager Acme Truck Co.

"Better Instruction Books" was the topic of the paper which Mr. Keene of the National Motor Car & Vehicle Corp., presented. Mr. Keene's paper follows:

"I think all of us will admit that most instruction and parts books issued by motor car manufacturers leave room for considerable improvement. Usually the larger units entering into the construction of a car are covered in pretty good shape; however, the smaller ones are often slighted or omitted entirely.

"To make up this deficiency, it is an established practice among most parts and accessory manufacturers to issue leaflets giving instructions on the care and operation of their product, these leaflets being furnished to automobile manufacturers for distribution among buyers of their cars.

"The number of these various leaflets is quite great, so that they are a nuisance to handle. Besides, if they are not bound into the instruction book furnished by the manufacturer, they are often mislaid or lost.

"It occurs to me that both automobile and accessory manufacturers would be greatly benefited if they would arrive at a standard size for all instruction literature, the parts manufacturers preparing their literature in such a way that it could be bound into the instruction books of automobile manufacturers.

"This would insure complete and detailed information concerning every part of a car being given in the way that the manufacturer of said parts thinks best, and certainly it would work a great improvement over most instruction books now in use. As to the size of the leaflets, I would suggest a standard of 6 by 8 in. with each leaflet punched with a couple of holes at the left hand edge for binding, ordinary staple fasteners being used for this purpose. When assembled with other leaflets provided by the car manufacturers, and provided with a cover, a complete instruction book would result that could be changed in part from time to time, as changes in equipment would

warrant, yet would never go out of date altogether, except with a complete change of models, scrapping all equipment previously used.

"Many instruction books furnished only cover the various mechanical details in a general way and do not contain the detailed information relative to the care and adjustments of the individual units of the car so stated that they could be readily understood by a new owner, few of which know little, if anything of the proper care of a car. In the past the large majority of owners never cared to know much of the care and adjustment of their cars, as long as a garage was handy.

"Personally, I am convinced that the majority of the owners especially of the

Axioms from Service Manager's Convention

- ¶ Service is a factor equally as important as sales, and not an adjunct.
- ¶ Service is a forerunner of re-sales.
- ¶ Service should be our national by-word.
- ¶ The Spirit of Service should be the slogan of the service personnel.
- ¶ He who serves best profits most.
- ¶ The service rendered with a smile gets across.

cheaper class of cars are getting away from that idea and are becoming more interested in caring for their cars personally, and for this reason I feel it the duty of the manufacturer to furnish all possible information to the owners through their instruction books. It is agreed by manufacturers that many of their cars fall into the hands of owners that have no mechanical ability whatever and in such cases would prefer to have them not attempt to do their own work, but as the percentage of owners of this

HOW TO WRITE SALES LETTERS

Arousing Interest

The same fundamental principles that apply to successful salesmanship are likewise applicable to sales letters. In planning a letter or set of sales efforts in the form of letters, it is always well to keep in mind these fundamental principles which may be classed as follows:

- 1—Attract Attention
- 2—AROUSE INTEREST
- 3—Create Desire
- 4—Stimulate Action

Each one of these elements should follow in logical sequence and, if properly handled, should produce the desired effect.

BY J. R. HANNON

SINCE the beginning of our letter secures attention, the matter immediately following should create or arouse interest. The attention already secured must be quickly turned to advantage because very little time elapses in the reader's mind between the opening and following paragraphs.

The most important and, perhaps, the most successful method to arouse interest is through the so-called "human interest" element—a direct appeal to the emotions.

When we talk to our readers about ourselves, and our own affairs, we don't arouse the interest we would by talking about their problems, their business, or their cars. This is human interest and we must learn to connect a reader's particular problems, business or car with our own proposition.

If we will always keep in mind this personal element and realize that our reader is always more interested in HIMSELF, HIS needs and HIS desires than in the things we sell, we're going to write our message accordingly and get a ready listener. To do this, we must sprinkle our letter with a reasonable amount of "You's" and "Yours" instead of so many "We's" and "I's."

The following shows how the "human interest" and "you" element is taken care of:

A hired man who could do nothing else but plow corn or saw wood wouldn't be worth much on your farm. What you need is a man who can do practically all of your farm work—in fact, the adaptable man is the most valuable to you.

And so it is with a tractor. If it is good only for plowing, or can be used only for belt work, you could hardly afford to own one. It might be too expensive to buy a power plant that could do only one job.

Notice how this writer has introduced the subject from the reader's viewpoint

instead of his own. Had he written this as follows, his appeal would be less effective:

"We can show you through our knowledge of Farm Tractors the best way to decrease expenses, etc., etc."

No matter how well we know our goods, their value or their usefulness, we cannot hope to put them across effectively until we know how they can be easily and naturally applied to something in which our reader is already interested or of which he has some knowledge.

For example: We should not try to interest one in buying a car by telling him certain things about the engine, its cylinders, the carbureter, the starting and lighting system, etc., *when all such talk is perhaps Greek to the man who has never owned one.* The better way would be to talk from his point of view, show

him how a busy business man can use a car to increase his efficiency, save time, promote his own and family's health, etc. These matters INTEREST him.

Of course this line of sales talk is to be directed to those who are unfamiliar with our proposition and what it will do for them. A different line of selling ammunition must be directed to those who know. This brings us around to another interest element—one to be directed to those who know. To this class we appeal in a different way from the injection of "human interest."

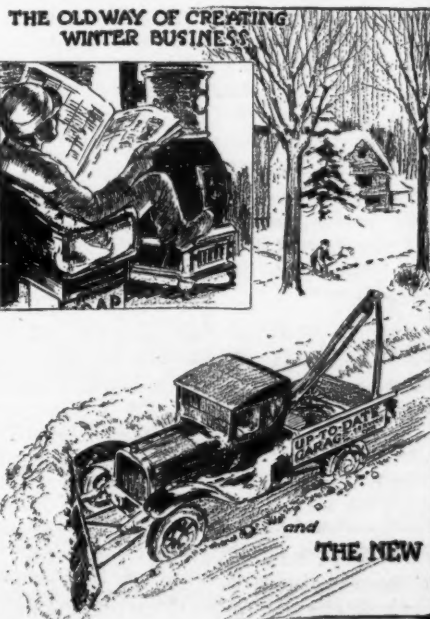
In addressing them we must turn right around from the method pursued in selling the unfamiliar man. They must be told plain facts, they are interested in details, quality, price, terms, etc.

Instead of telling this class about increased efficiency, time saved, health promoted, etc., they want to know just the reverse, viz.: Cylinder capacity, bore and stroke, hp., wheelbase, tire size, etc. To get right down to brass tacks, facts. They are the class, for example, who already own cars, know what they can do and are interested only in whether or not they can get better results from the specific car that is presented.

Needless to say, one must thoroughly understand his own proposition before addressing this class and must use great caution because it is evident that the man who "knows" will easily detect absurd statements, ignorance and deception.

Summing up this entire subject of arousing interest, we find certain objects that the writer must keep in mind. They are as follows:

1. Talk to our reader about HIMSELF.
2. Why, from a purely selfish viewpoint, he should buy our goods.
3. What he will gain by buying.
4. Don't become over-enthusiastic and oversell ourselves.



Preparing Anti-Freeze Solutions

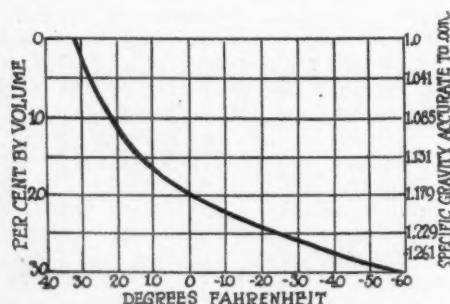
Regardless of what mixture is used the cooling system must be thoroughly prepared for it

In mixing any of the various solutions, which the dealer may prefer to do rather than buy a prepared solution, the following suggestions outline the correct methods to follow

In the use of anti-freeze compounds and solutions there is more to consider than just the mere dumping of the material into the radiator and then starting up with the intention of letting the cooling system go the rest of the winter. There are many car owners who make up their own solutions, but in the majority of instances where this "home brew" is resorted to, the best and most efficient results are not obtained. Very often the owner will buy his anti-freeze compound and add it to the radiator but will take no pains to prepare the radiator for the compound.

A small leak in the radiator, so small as to be imperceptible, will very often cause trouble if an anti-freeze solution is added, although continuous running throughout the summer months failed to develop any trouble. The owner finds time to prepare his car for the anti-freeze after hours and on Sunday mornings when everything is attempted at once. From the rash haste in which much of the work is done, there results only dissatisfaction and eventually the dealer gets the repair job after all.

To spare the owner the inconvenience of finding out that he does not know as much about anti-freeze as the dealer's expert mechanics, and further to spare him the trouble of preparing an unsatisfactory solution which experience proves is generally the case, the dealer will do well to educate the owner to the time, money, and trouble saving of the anti-

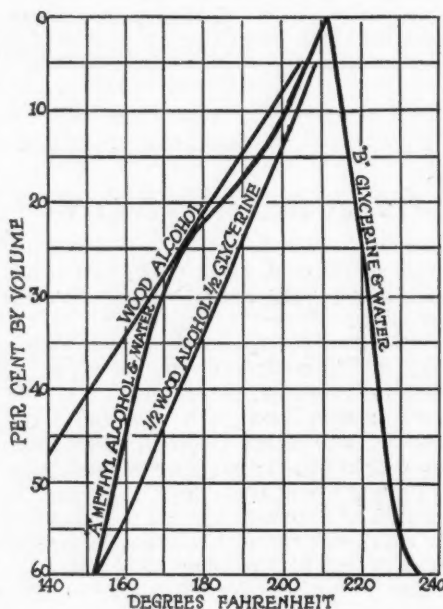


Curve showing freezing temperature of calcium chloride solution, mixed by volume proportions from the saturated solution or mother liquor

freeze service which his establishment is prepared to render.

There are on the market a great number of anti-freeze solutions and com-

By ROY E. BERG



The boiling point of various solutions is a very important factor. The values are shown in the above curves

pounds which are well prepared articles and extensively advertised, which latter reason, is good and sufficient cause to remove any doubts as to the sale of the article. Any well advertised article having a universal demand and which sells at a price well within the reach of the average motor car owner may safely be stocked by any dealer.

Many dealers are of the opinion that they would rather make than buy their anti-freeze solution material. To these we would offer the following as a few suggestions:

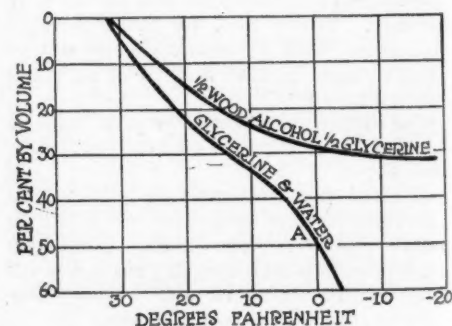
Let us consider first the anti-freeze material made by mixing alcohol and water. The denatured-alcohol solution is, with one exception, the closest approach to an ideal anti-freeze compound that we know of. The exception is, of course, the vaporization properties of the solution after it is made up. One suffers from this not because of the small annoyance caused by the replacement due to evaporation but because of the danger that results when the weather takes an occasional change.

A car having in its cooling system a solution of alcohol and water will run along in the cold weather without much evaporation, but as soon as a warm day is announced by the weather department, all the alcohol evaporates, leaving behind the water. Should the weather then change again the next day for a colder temperature the radiator and engine will have little protection. There are few men who will remember to replenish the supply after a warm spell.

Another substance which is often used without much consideration is a light oil or kerosene. Those who are favorable to this type of cooling fluid we would direct to the insurance company. Kerosene heated to 180 deg. Fahr. is a most inflammable liquid. A spark will set it off. Not only is there the danger from fire but the hose connections are not immune from the ravages of oil. Oil and especially kerosene and even lighter petroleum compounds like gasoline have a most deteriorating effect on rubber.

If the already cited objections do not create a sentiment against kerosene and oil as anti-freeze solutions, perhaps the obnoxious odor created by their use, will. Glycerine is also a compound that falls into the class with kerosene and oil as regards the effect on the hose connections. Then, too, glycerine is expensive, and more of it is needed than alcohol for the same conditions.

The question of using salts like calcium chloride is one that should be ad-



Freezing temperatures of glycerine and alcohol-glycerine solutions

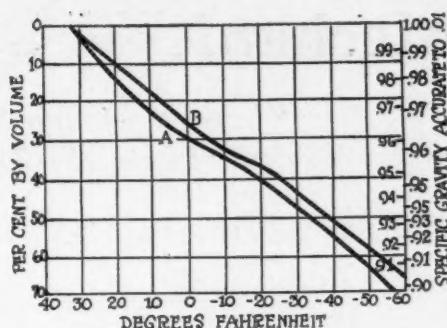
vised only with discretion. By that we do not wish the inference drawn that calcium chloride is not to be used or that we advise against it. With intelli-

gent handling calcium chloride will give the most satisfactory results.

Before attempting to use calcium chloride solutions the cooling system must first be carefully cleaned, otherwise only mediocre results will be obtained. The material recommended to clean the cooling system is a hot solution of baking soda or soda ash.

The best way to consider the mixture of calcium chloride and water is by a volumetric proportion. This is perhaps the easiest way to mix the liquid and the only way by which accurate results may be obtained. A saturated solution of the calcium chloride is first made. This is produced by dissolving as much calcium chloride in a bucket of water as the water will take up. Now using this liquid as the mother liquor of the solution, pure water may be mixed with it in the proportions as given in the chart.

The reason for doing the work in this manner is that calcium chloride is nat-



Curves showing freezing temperatures of alcohol solutions. A, ethyl alcohol and B methyl alcohol

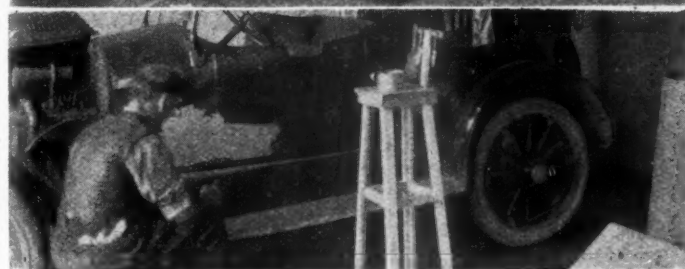
urally a deliquescent salt, which is a chemical term used to express the thought that the salt absorbs moisture from the air. It is not possible to tell how much water has been absorbed by

any batch of material, hence the saturated liquor method of mixing the anti-freeze is destined to be much more accurate than the pound to gallon proportion. This is also the reason why success does not generally crown one's efforts in mixing up water and calcium chloride.

There is another important consideration which applies to all anti-freeze compounds regardless of their class, and that is the effect upon the boiling point of the solution. Ordinarily we consider 212 deg. Fahr. as the boiling point of water. At sea level and under ordinary barometric conditions the boiling point would be exactly 212 deg. Fahr. The temperature at which most engines are designed to run efficiently is 180 deg. Any solution which would have a boiling point of less than 180 deg. would be a very poor material to use, obviously. The curve shown in the accompanying column is designed to give this information.

In the Paint and Trim Department

Dealers Are Adding This Service to Their Business



These pictures taken at the Bird-Sykes Co., Chicago dealers, may give you some idea for your paint and trim department. Note for example the stand used by the painter for holding his color cup and brushes. There is nothing difficult about a stand of this kind, but it does save time and the energy of the man. Note also the trestle work put up around the body on which is being fitted a California top. There is a thought in every one of these pictures and you may be able to detect them by comparing your paint and trim department with what you see in the pictures

Some Facts About the Paint Coat on Motor Cars

HAVE you ever considered the severe exposure that the paint coats on the car must withstand when it is taken from the warm garage out into zero weather, and the enormous stresses set up in the paint coats on the hood, when it is subjected to the heat of the engine on the inside, and to zero temperature on the outside?

If a quantity of water is placed in a can, the can sealed and heated sufficiently, the steam generated will burst and destroy it. Similarly, if a piece of painted wood or metal, containing moisture under its paint coat, is heated, the escaping steam will destroy the paint coat. Wood is quite porous, and before it can be decorated with paint, it must be thoroughly dried first. The same holds true with the metal, which though less porous than the wood, is still porous, and must be treated accordingly. Once having made sure that all moisture has been excluded from the pores of a piece of wood or metal, it is simply a matter of filling these pores with some suitable material, in order to effectually seal them against the further absorption of moisture. Materials used for this purpose are called PRIMERS, or "first coaters," and it is their duty to fill the pores of the material and seal them, thus establishing a reliable base upon which the succeeding coats can be organized.

A primer must have good penetration; that is, power to penetrate into the minute pores and effectually seal them; it must be non-porous itself, and as it is to be the foundation for the succeeding coats, it must be sufficiently elastic to adjust the different rates of expansion that take place between the paint coats and the painted surface.

SURFACERS

A piece of sheet metal offers a smoother surface than a piece of wood, but, nevertheless, it possesses surface inequalities that must be filled and leveled before it presents the fine smooth surface that is so essential to the beauty of the finished job. The materials used for this surfacing and leveling work are known as SURFACERS, and the one most commonly used is ROUGHSTUFF, and is used to cover up the ROUGHNESS of a surface.

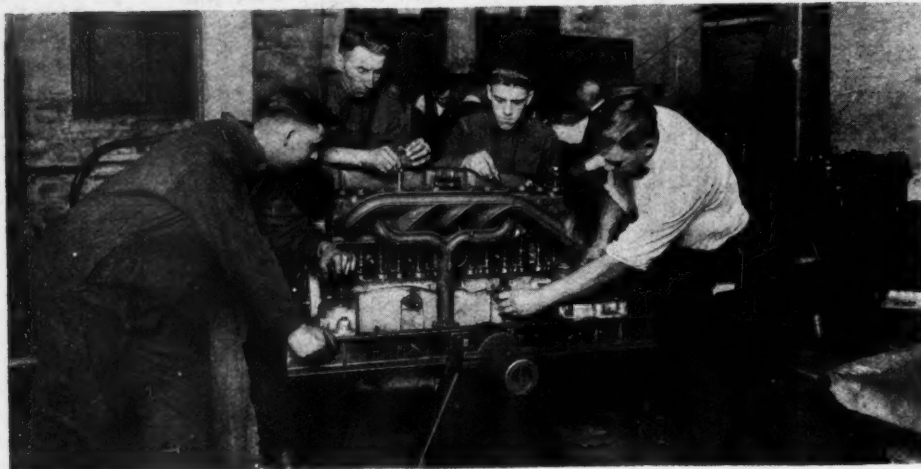
The materials used for this surfacing work do not dry to a smooth surface, but are rubbed down with a rubbing stone and

(Concluded on page 28)

Making Better Mechanics

What a Chicago School Is Doing to Help Train the Dealer's Mechanics

An Idea for Dealers in Other Cities to Use the Public Schools to Train Their Men



Two scenes in the South Division School, Chicago, showing mechanic receiving instruction in ignition and engine repairs

WITH the view in mind not of taking a man from the street and teaching him automotive mechanics but of taking a man at present employed in this line of work and teaching him better mechanics, the Chicago board of education has thrown open the doors of one of its continuation schools to men wishing to become more proficient through instruction in the day time. With the co-operation of dealers, service managers, garage owners, in fact any one employing men whose work it is to repair automobiles, it is felt that the school will fill a long existing need.

It is felt, at least, that it will do away with the propensity of some employees to gain their knowledge through drifting from shop to shop, picking up a little here and a little more there until they become fairly capable to do a job—but,

all the time gaining this experience at the expense of the employer. Many a man with no experience at all has gone into a repair shop and told the proprietor that he is experienced, only to leave in the course of a week or two with a smattering knowledge of an engine which will carry him to the next shop in need of men. There he will obtain the second relay in his course of instruction, all the while making the job on which he is working worse through tinkering at something he knows little about in order that he may learn. He is learning, there is little question about that; but he is learning at the expense of the proprietor.

What the Chicago school for better mechanics plans to do is to take a man from one of the shops and give him instruction through competent instructors so that the employer may be bene-

fited, as well as the employee, and without this instruction costing the employer any more than what is represented by two afternoons or two mornings off a week. At the school he can tinker with engines all he likes; he can ask all the questions he wants to and he can tear down and build up to his heart's content. One of the benefits of such a method of improving the mechanics now at work will be the curtailment of the labor turnover which forms a large item in the expense and management of a service station or a garage.

The South Division Continuation School which is its name was established in February, 1919, as the outgrowth of a training center during the war. It is located at Twenty-sixth Street and Wabash Avenue, only a block from Michigan Avenue, the heart of the automobile business in Chicago. The school is operated on a part-time basis for adults and has various classes of students. Among these are mechanics working in the automobile industry who desire a short course in some detail of the technic of their work; more advanced students who are given a complete course in gas engine mechanics; and automobile owners or drivers who wish to learn enough about their cars to make ordinary repairs.

The gas engine course covers a period of six months. A shorter course is given for car owners as it is realized they would not be warranted in going into the mechanics of the automobile as thoroughly or as deeply as the mechanic himself. The student is given the theory of the four-cycle engine and is taught through practical work its operation and care. He is given a course on rear axles, transmission, clutches and steering devices. His instruction includes lessons on ignition, the magneto and battery system. This course is concluded with instruction on starting and lighting.

In the gas engine course the greatest difficulty is that the dealer, and others, will not grant their employees time off in order that they may attend the school. They do not seem to appreciate that the school is started for their benefit and that the more efficient the mechanic becomes the better will be the business as a whole. Neither do they realize that the ordinary mechanic will hesitate to ask questions in the shop for fear of displaying his ignorance whereas in the school where he is comparatively unknown, he will feel at liberty to go ahead and ask to his full content without fear or embarrassment.

When the course is completed the student will go out with a diploma or card showing his attendance at the school and his rating. Inasmuch as this certificate is signed by the instructor it will bear bona fide evidence to his ability as a mechanic.



The stock of Ford parts in J. H. Pritchard's service station is systematically stored. Each part is filed in its separate bin according to number. A card index system enables anyone to locate the desired part immediately

Pritchard is Making Money Selling Parts

He keeps a large stock of Ford parts and sells them to garages and service stations in his territory. The method of stock arrangement is very efficient. Revise it to suit your needs

THE margin of profit on the sale of parts is not generally very large and, if this department is to be made a money-making proposition it will have to be accomplished by boosting sales. A great many automobile dealers sell parts only to those owners whose motor cars are serviced in their stations, and make little or no effort to sell parts anywhere else or in any other way. For instance, a car may be brought into the station for repairs. The mechanic working on the job may decide that one or two parts are needed to replace some that have seen the limit of their days. They will be supplied by the parts department and a certain margin of profit will be made on the sale. In most service stations, this is about as far as it goes, save in the case of distributors, of course, who sell to their sub-dealers.

Parts Sales on Big Scale

In the case of the J. H. Pritchard service station the parts department functions on a much broader scale than this. A certain percentage of sales are made through the service station in the manner described above, but it does not end there, as is so often the case.

In the first place, the accompanying photograph shows how very systematically parts and accessories are arranged and displayed. Every part is filed in its separate bin according to number. A card index system wherein the parts are filed according to name enables anyone to locate the desired part within a moment's time. Virtually every Ford part is carried in stock, the quantity, of

course, always depending upon the demand for each particular part. A card index is also maintained of all sales made from day to day enabling the man in charge to know exactly what deductions have been made from his stock. While this is really a continuous inventory accurately kept from day to day, a stock inventory is taken on the floor every month. The records are so systematically kept that results of the monthly inventory will almost always correspond with the figures shown by the inventory obtained from the daily card index of sales made.

Building Good Will

The importance of this method lies in the fact that it builds good will as it is never necessary for a customer to wait until a certain part is ordered from the factory. Every part can always be found in stock for the continuous and monthly inventories makes it possible to determine at a glance the exact stock on hand and the average demand for every part. The quantity of every part in stock is always kept up to a certain mark based on the average demand.

This department has been made a substantial, money-making proposition for the simple reason that it has been pushed just as much as any other department. Not satisfied with selling parts merely to those customers whose automobiles were serviced in his station, Pritchard has reached out and broadened this market to a considerable extent by means of direct mail advertising, personal letters to prospective buyers, some newspaper

advertising, and a liberal use of the telephone.

The principal customers for outside sales of this nature are the many garages and service stations in his territory which are operated as separate enterprises, not in connection with an automobile selling agency. These buyers, of course, are allowed a certain discount on the list price, but at the same time a certain small profit is made on every sale. By specializing in business of this nature, by always being able to supply any part at a moment's notice without the delay of sending to the factory for it, by having a capable man in charge of the department, and by keeping everlastingly at it, a volume of business has been built up in the parts department that adds a substantial sum to the total income of the business as a whole.

One of the principal methods of keeping parts sales up to the notch is by having the men aim at a certain target every day and do their best to equal this mark, or to exceed it if possible. Presuming parts sales during the month of November would average \$300 for every working day, this will be the target aimed at during the month of December—\$300 daily in parts sales. Every effort is made to maintain this same average during December or to go higher than that if it can be done. In case a higher average is reached then this is set as a new target.

Aim at Highest Sale

It is always the highest previous average that serves as the mark the department aims to equal or to surpass. With some definite incentive to work for in this way much better results can be obtained.

Every morning men in the parts department call on the telephone a long list of customers. These are mainly garages and service stations in Pritchard's territory.



Three-quarter view of the new seven passenger Handley-Knight. Solid aluminum molding around the top of the body gives a smooth finish over the door edges

Specifications of the Handley-Knight

*Engine—Knight, four cylinder,
4 1/8 by 4 1/2.*

Carbureter—Tillotson.

Ignition—Connecticut.

Starting—Auto-Lite.

Clutch—Borg and Beck.

Wheelbase—125 in.

Weight—3200 lbs.

Price—\$2985 f. o. b. factory.

New Handley-Knight An Assembled Job

THE Handley-Knight, a new model now in production hailing from Kalamazoo, Mich., is an assembled product.

The units from which the car is built up are all well known in the trade and include the Knight four-cylinder, sleeve valve engine made by the Willys-Overland Co. at Elyria. The clutch is Borg & Berk, transmission gearset, Grant-Lees; universals, Sneed-Thermoid; axles, Timken; steering gear, Gemmer; electrical equipment, Auto-Lite; carbureter, Tillotson, and battery, U. S. L.

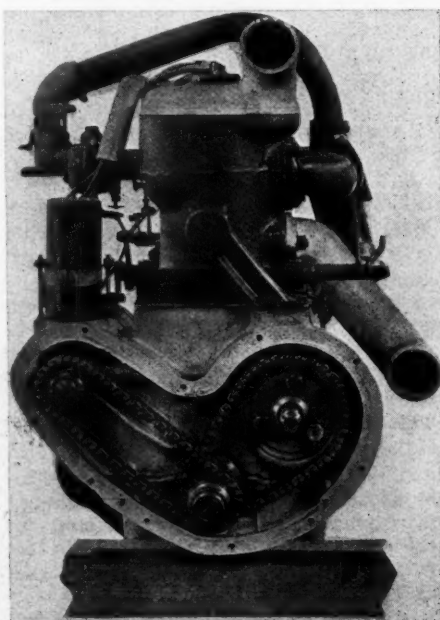
The car is completely equipped including moto-meter; a 75 mile Van Sicklen speedometer; eight-day clock; dash lamp with extension cord, tonneau lamp and a complete set of tools. The touring car, complete for loading, weighs approximately 3200 lb. The touring car sells for \$2985 f. o. b. factory and is of seven-passenger capacity. This is an aluminum body on an ash frame, upholstered in long grain, hand buffed leather with a semi-bright finish. An unusual feature of the finish is a solid aluminum molding placed around the entire top of the body to give a smooth finish over the door edges. The car is fitted with curtains arranged to open with the doors.

Shipments on the new Handley-Knight have just started from the factory. These shipments are the initial output of the Handley-Knight Co., which was incorporated Jan., 1920, and for whose factory, ground was broken in Kalamazoo on April 10. The first experimental car was completed on July first and the Detroit and Chicago dealers received their first shipment Oct. 31.

The new plant, which is just getting into production, will be devoted exclusively to the manufacture of Knight cars mounted on a single chassis. At present

Composed of Units Well Known to the Trade. Shipments Have Started from the New Factory Which Has Capacity of 5000 Cars Per Year

two body types are provided, a seven-passenger touring and a seven-passenger sedan. Production for the balance of this year will probably be limited to one hundred for November and one hundred for December, although the capacity of the factory is sufficient to take care of a



Front end of engine with chain case cover removed showing drive of generator and eccentric shaft

production of 5,000 per year, being a 64,000 sq. ft. structure on a 40 acre plot of ground.

All of the units employed have been manufactured for a number of years so that the car is in no sense a new product as far as its individual parts are concerned. The engine is the 4 1/8 by 4 1/2 Knight design which has been turned out for several years at the Elyria plant. The cylinders are block cast, grey iron, with a three-bearing, 2 in. crankshaft.

The engine is made in unit powerplant construction with the standard S. A. E. bell housing. Aluminum alloy pistons are used with four rings, three compression rings and one wiping ring. The piston is 4 27/32 in. in length and is fitted with a hardened and ground, hot rolled steel wrist pin. The connecting rod is a machined and balanced type 10 in. in length. The sleeve valves are of grey iron, the outer sleeve length being 10 15/64 in. in diameter and the inner, 11 15/16 in. The port openings for the exhaust are 4 in. by 1/2 in. and for the intake, 4 in. by 3/8 in.

The engine is oiled by a positive pressure feed to all bearings. The pistons, sleeves and cylinder walls are taken care of by centrifugal throw and the connecting rod bearings are lubricated through leads drilled in the crankshaft. The capacity of the oiling system is 6 qt.

Water is circulated by Thermo-syphon system, the water jackets being large

and also so constructed as to completely surround each cylinder. Cooling is assisted by a $17\frac{1}{4}$ in. fan with four pressed steel blades. It is mounted on a cup and cone bearing on a bracket with eccentric adjustment for tightening the belt. The fan belt is flat leather 1 in. in width. The eccentric shaft drive is by link belt chain.

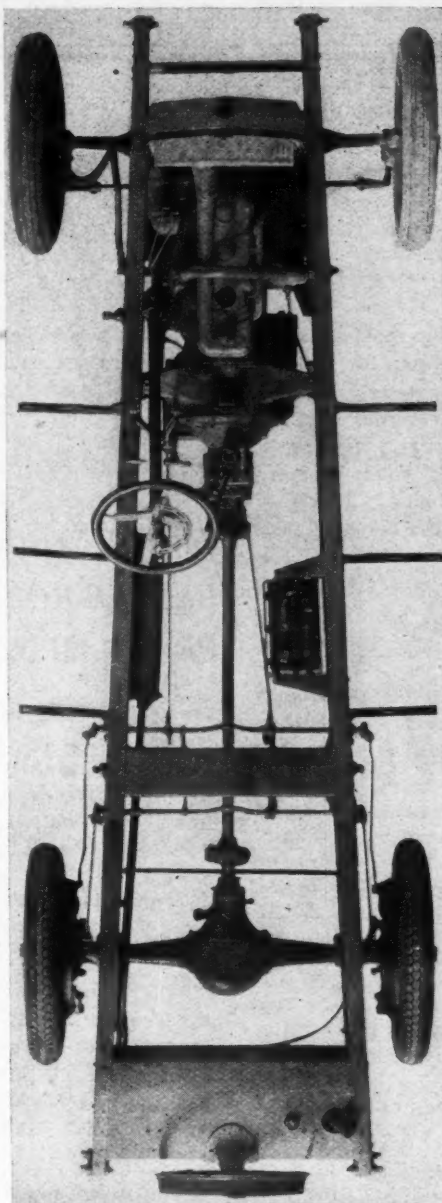
For carburetion, a Tillotson, metal reed, float feed, $1\frac{1}{4}$ in. in diameter unit is employed. The electrical equipment consists of an Auto-Lite generator, Auto-Lite starting motor, Connecticut ignition system with automatic cut out, and the battery is a 162.6 amp. hr.

The clutch is a 12 in. Borg & Beck, three disk type, delivering the drive through a three-speed Grant-Lees transmission with $\frac{3}{4}$ in. face gears of 6-8 pitch. The gears and shafts are both of $3\frac{1}{2}$ per cent nickel steel, the main shaft being $1\frac{1}{4}$ in. in diameter and the splined shaft $1\frac{1}{2}$ in. outside diameter with splines $\frac{3}{8}$ in. in width and $3/16$ in. deep. This gearset is mounted on annular ball bearings and provides the following reduction: First speed, 2.985 to 1; second speed, 1.733 to 1; third, direct, reverse, 3.903 to 1.

Snead-Thermoid Universals

The universals are the Snead-Thermoid flexible type mounted on drop forged, heat treated spiders. The spiders are attached to the propeller shaft by shrinking the hub over the shaft, then driving a hexagonal web into the end of the latter, expanding it to fit a hexagonal countersink inside of the spider hub. The tube, wedge and spider are then electrically welded. The universal joint disk diameter is 7 in. and the propeller shaft $1\frac{1}{4}$ in. The material in the propeller shaft is aeroplane tubing with $1/16$ in. walls. The propeller shaft is given a running balance after the universal joint spider is attached.

The Timken rear axle is the fixed hub type with a pressed steel housing. The gear ratio provided in this axle is 4 5/11 to 1, the gears being the spiral bevel type with $1\frac{1}{4}$ in. face of 6 pitch. The drive-shaft is $1\frac{1}{4}$ in. in diameter, tapered and keyed in the hubs and splined with six splines to fit in the differential. Both sets of brakes are located on the rear wheels and act on a pressed steel drum $15\frac{1}{2}$ in. in diameter. The woven asbestos bands are $2\frac{1}{2}$ in. wide, providing 100 sq. in. of emergency or hand brake area and



Plan view of Handley-Knight chassis showing plan view of driving units. Note the exterior rear brake rods providing accessible adjustment

111 sq. in. of service or foot brake area. The drive is Hotchkiss type.

The frame is channel section with 6 by $2\frac{1}{4}$ in. side rails of pressed steel, $3/16$ in. section. The chassis is mounted on exceptionally long semi-elliptic springs,

the front being 38 in. and the rear 61 in. Both springs are $2\frac{1}{4}$ in. wide, the front spring having seven leaves and the rear eight. The springs are chrome vanadium steel with large shackle bolts, $\frac{3}{4}$ in. in diameter, except the rear spring front bolt, which is $1\frac{1}{4}$ in. The drive and torque, of course, is taken through this bolt. The front axle is L-beam section with a $13/16$ in. king pin, the king pin bearing being a Timken lubricated by a special drip feed. The steering gear is worm and wheel, irreversible, Gemmer, with ball thrust and an 18 in. corrugated walnut wheel. The tire size is 32 by $4\frac{1}{2}$ in., all around, the stock equipment being cord with non-skid on the rear. The wheelbase is 125 in. Ground clearances are $9\frac{1}{4}$ in. under the front axle; $8\frac{3}{4}$ in. under the rear axle; 11 in. under the fly-wheel housing and $12\frac{3}{4}$ in. under the running board.

ALVIN T. FULLER ELECTED

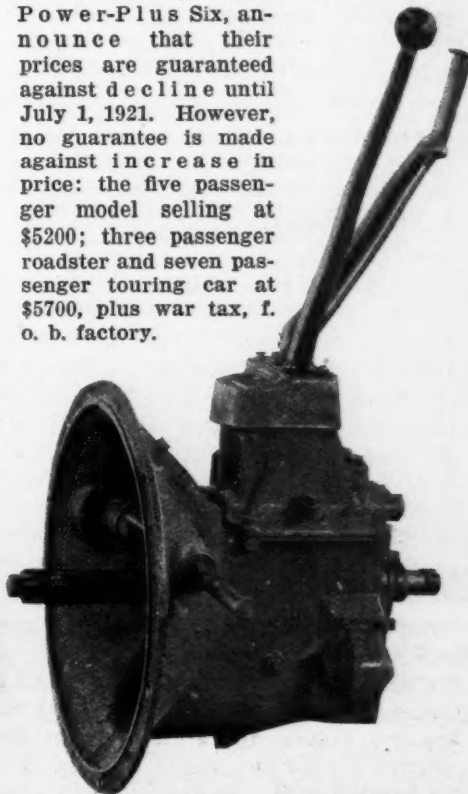
Boston, Nov. 12—Congressman Alvin T. Fuller, eastern New England distributor of the Packard and one of the pioneers in the automobile business, has been elected lieutenant-governor of Massachusetts. He was endorsed by the motor car trades of greater Boston.

NEW DU PONT PRICES

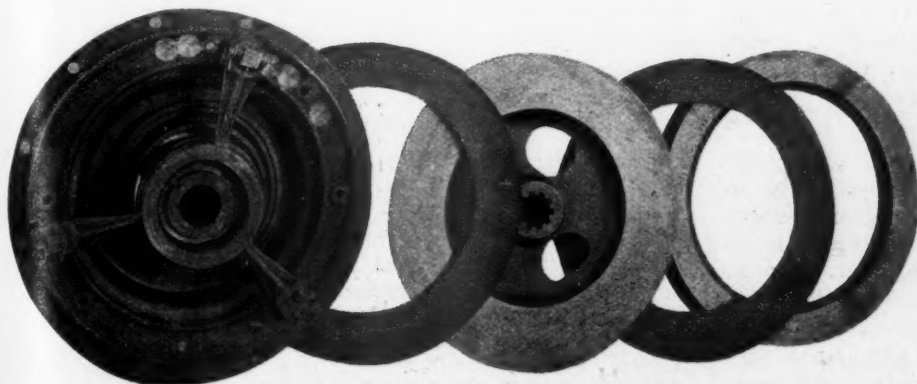
Wilmington, Del., Nov. 9—New factory list prices of du Pont automobiles are announced as follows: Touring, \$3,400; roadster, \$3,400; suburban sedan, \$4,900; touring sedan, \$4,900. The new prices are effective at once.

LEACH PRICE GUARANTEED

Los Angeles, Nov. 8—The Leach Biltwell Motor Co., builders of the "Leach" Power-Plus Six, announce that their prices are guaranteed against decline until July 1, 1921. However, no guarantee is made against increase in price: the five passenger model selling at \$5200; three passenger roadster and seven passenger touring car at \$5700, plus war tax, f. o. b. factory.



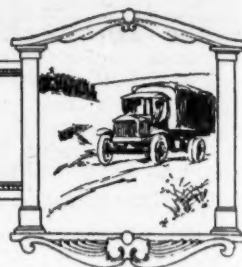
Grant-Lees transmission gearset — one of the standard units used in the Handley-Knight



Borg & Beck clutch as used in Handley-Knight



EDITORIAL



YEAR 'ROUND BUSINESS

If you have to use your service station or garage as a storeroom for potatoes this winter do so.

If you have to turn over your business to doing something entirely foreign to the usual activities of your business, do so.

Do anything to keep the doors of your business open, literally speaking.

We do not believe it will be necessary for any dealer or service station to have to resort to practices heretofore unknown to their business in order to keep going this winter. We are speaking primarily, of course, to those dealers and service stations located in the northern part of the country where winter means heavy snows and extremely cold weather.

Those who have made their plans early this fall have not much to worry about concerning winter business. The wise dealer has put forth the necessary effort to insure year 'round business. He has simply made the winter months incidental to his business. When we get up into the cold country we put on heavy clothes, wear mittens and put on ear muffs. We don't hibernate all winter and wait until spring before getting out and proceeding with our business. We make winter incidental to our living.

We see to it that our coal bins are filled up in the fall with the necessary fuel to insure our warmth. The women of the house have been busy in the fall "putting down eggs" and sewing on buttons on the childrens' winter clothes. In other words, we have in our daily lives realized that for certain periods of the year we must live and act differently and set out early enough to meet those conditions.

With election out of the way and with the many other things with which the industry has had to contend during the year out of the way there is little reason why business for the automotive dealer should not gain impetus from now on.

One thing should be borne in mind regarding the dealer's business and that is this. Regardless of how sales fluctuate, service never varies. As long as we have automobiles, trucks and tractors operating there is going to be a certain amount of maintenance work. This winter will offer the best opportunity many dealers have had to build up their service. Once the dealer makes a lasting impression on his community with the excellence of his service, he is sure to reap his reward in the way of car sales later on, when the people of the country have become convinced that car prices have reached rock bottom and the industry once more becomes stabilized.

Concentration will do wonderful things. The dealer who makes up his mind that winter service work is available in his territory and then concentrates for a time on methods to get that work into his shop early will go on with his business without any great apparent hitch. But, he must not wait for the business to come in. Ducks do not fly into the hunter's yard. He has to go out after them, and, what's more, he must have the right kind of gun and ammunition. So, let's go out after the vast amount of service work avail-

able this winter and check over our shops and equipment, to make sure we can take care of the business once we get in sight of it and have the chance for a "pot shot."



DRAFT YOUR BETTER ROADS PROGRAM NOW

LEGISLATURES are on the point of convening. Bills providing for road building, following the referendums which have been held in some of the states, will be introduced, some of them plainly not meeting the essential requirements for better roads. Some of them, indeed, may prove in the end to be destructive rather than constructive in character. Bad bills are worse than no bills at all and if bills are introduced they should be drafted by persons who know precisely what they should contain. It is bad policy to wait for a measure to be presented to the legislatures and then to muster forces to fight it if it is not satisfactory. A long up-hill fight follows and the result frequently does not meet expectations. The best way to fight a bad bill is to get there first with a good one.

No body of men is better fitted to draft a road building program than the man closely connected with the automobile industry. Good roads and better roads have become an intimate part of his trade. He has become the prime advocate for the best roads that man can build. His business depends on the kind of highways and byways there are throughout the country.

Out in a western state a purchaser of an automobile found the morning after he had put the car into the garage that a heavy rain storm during the night had washed away the road which he and his purchase had traveled and that there was no way to get out. That road is still unimproved; that car is still in the garage and the owner has been waiting four long years for a road program to reach his doors. This probably is an isolated example but it shows to what extent roads and better roads—roads that will not be washed away by a storm so that after four years they remain impassable—concern the automobile dealer.

Now, on the eve of the convening of the legislatures, is the time to draft a better roads program. Get there before the other fellow, who has not so closely at heart the condition of our roads, as the automobile dealer has, presents his bill.

Reports from different sections of the country following the recent election show what the dealer was able to accomplish through organized effort in the matter of having bond issues authorized. He took an active part in stimulating interest in the matter of better roads and in so arousing the voters that the referendums, in many of the states, received the favorable vote of the electorate.

He should have as keen an interest in seeing that the appropriation so authorized is spent wisely.

A better roads program can bring this about.

And now is the time to get this program moving, to see that it is drafted and presented to the legislatures.

Retail Sales of Automobiles Is Improved, Survey Shows

Reports from Newspapers Throughout Country Coincide with Those Gathered by Motor Age

NEW YORK, Nov. 15—Slow but steady improvement in the retail sales of automobiles with a general upward trend in the business was disclosed by a survey of the country made last week by the H. E. Lesan Advertising Agency of this city and Chicago.

To determine the real feeling regarding the motor car industry for the next two months and immediately following the turn of the year, the Lesan company sent a wire to fifty of the most important newspapers in the United States asking them to obtain the facts sought from sources other than automobile dealers or persons interested in the automobile business.

The information, obtained from these sources almost entirely foreign to the merchandising of motor cars, coincided almost exactly with the surveys supplied MOTOR AGE by its correspondents in the leading distribution centers of the country. The two together offer indisputable testimony that sales resistance is weakening so far as passenger cars are concerned.

This was the telegram sent out by the Lesan company:

"Many present and prospective automotive advertisers anxious learn prospects automotive business immediate future independent usual dealer and business connections. Could you have reporter interview few citizens various lines occupation and wire night letter giving their opinion effect of recent price changes on immediate sales, possibility consumer buying this year and outlook for next year. Also opinion your automobile editor on subject. Real facts desired, agreeable or disagreeable."

Here is a summary of the replies prepared by the Lesan company:

"Replies confirmed the prejudice of bankers against the industry but showed that this prejudice is not shared by the public. Varying effect of initial price reductions was indicated but the belief prevails that, initial reductions having been made, general and even further reductions or guarantees against them are necessary to restore full confidence in respective buyers. A gradual but steady resumption of buying on individual cars has been noted where buyers are satisfied on this score, reducing dealer stocks, which should soon be felt at factories. Many comment on the fact that manufacturers, dealers and salesmen must overcome the demoralizing influence of the past sellers' market and get down to a business basis with real work and genuine service. Reports are almost unanimous that general business conditions are fundamentally sound and that the country is only going through a necessary period of deflation after which

business will be normal at new price levels.

"The reports said that motor cars are as necessary to the public as anything else and that the volume of business at the new price levels should furnish considerable trade yet this year, get to normal by early spring and be as large next year as this if the industry is prompt in making decisions, quick in action and aggressive in salesmanship."

The newspapers which supplied the information requested are located in every section of the United States.

Automotive Equipment Show Bringing Salesmen Together

CHICAGO, Nov. 15—The second annual show of the Automotive Equipment Association opened here today and all is in readiness for the calling to order of the association's fifth annual convention on Wednesday. The Coliseum and Annex where the show is being held have been decorated liberally with flags and bunting and every available inch of space has been brought into service for booths.

The address before the convention on Thursday, it is announced, will be delivered by United States Senator Medill McCormick.

Delegates, alternates, salesmen and others interested in automotive equipment began to arrive in the city the latter part of last week. They came from all sections of the country and when the show opened today all members of the association with few exceptions had their representatives present for registration. A feature of the week's event is the large number of salesmen expected.

Last year there was a creditable number on hand and so much good resulted from the personal contact between the manufacturer's salesmen and the jobbers that every firm which had its salesmen at the Medinah Temple show a year ago is bringing a larger proportion to the 1920 show and other firms which were not similarly represented last year will have a representation of their selling force at the present exhibit.

CONSIDER APPRAISAL BUREAU

Philadelphia, Nov. 11—The proprietary members of the Motor Truck Association of Philadelphia held a meeting today to discuss the proposed dealers' appraisal bureau for trucks taken on trade-in. There were 55 proprietary members in attendance, who listened to an explanation of the appraising of dealers' trucks as done by bureaus in New York and Chicago. It was decided to hold a meeting on the first Tuesday in December, to discuss the matter more fully. There seems to be considerable favorable sentiment toward the project.

Banner Year Is Reported by Rubber Industries in Akron

Coming Year Will Be As Good If Not Better According to Present Signs

AKRON, OHIO, Nov. 15—The closing of the fiscal year in Akron now at hand will show that it has been the greatest year in the history of local industries, and the coming year will be as good if not better, according to reports now available.

Semi-official figures from the large rubber industries joined to the official figures regarding annual sales of the Goodyear Tire & Rubber Co. show clearly that the business done by these companies during the year now ending has been more than a normal increase over the business of last year.

While Goodyear has announced a total sales record of \$208,000,000 which is an increase of more than \$41,000,000 over the banner year of 1919, Firestone has announced, unofficially, that its business will equal more than \$105,000,000 as compared with \$91,000,000 last year and \$75,000,000 for the previous year. Goodrich has already done more than \$140,000,000 with two months to go to the end of the fiscal year. The Miller Tire & Rubber Co. unofficially reports that its business will amount to more than \$31,000,000 as compared with \$27,000,000 for the previous year.

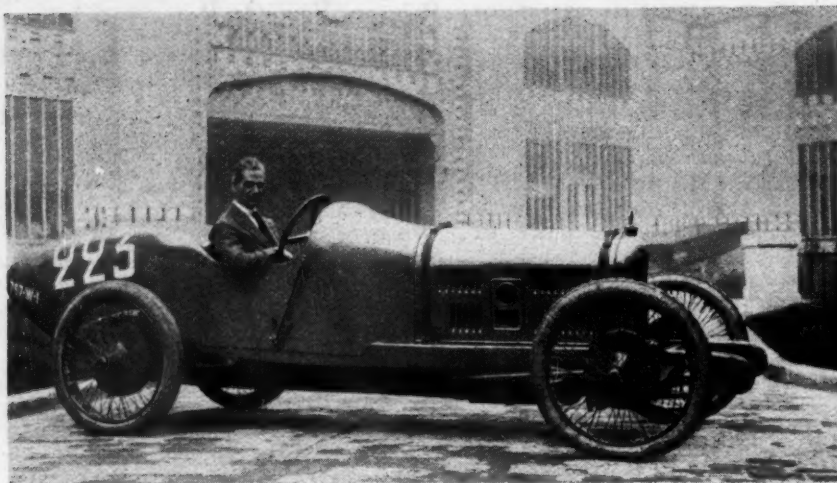
Castor Oil as Lubricant Is Topic for S. A. E. Discussion

Chicago, Nov. 13—A paper which dealt with castor oil as a general lubricant with particular reference to the lubrication of the internal combustion engine especially of the aeronautic type was presented by William F. Parish before the Midwest section of the S. A. E. last night. It showed that castor oil may have a good effect for certain classes of work when used for short periods of time but that after continuous use it develops characteristics that make it unsuitable in comparison with the proper mineral lubricating oil.

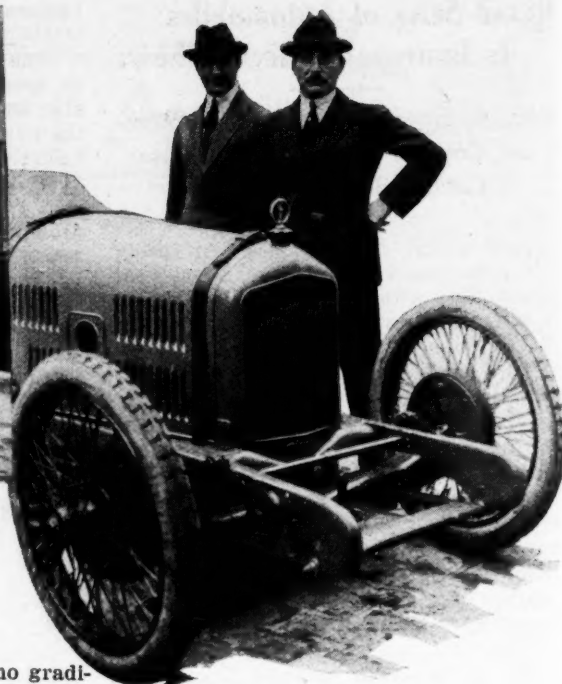
A report and chemical analysis was given by R. W. Smith of the Sinclair Refining Co., of the substance which was found after a test had been conducted on a motorcycle racing engine using castor oil. The substance found which caused the clogging of the oil feed pipes was similar to rubber, the analysis, however, revealing the fact that it was oxidized oil. J. W. Steck of the Standard Oil Co. discussed an analysis of the substance very similar to that which was found in the motorcycle engine which he had obtained from an automobile engine using castor oil.

WRECKING CRANE A MANLEY

The crane pictured in MOTOR AGE of Sept. 23 in connection with a home-made wrecking truck is a Manley general utility garage and wrecking crane, the product of the Manley Mfg. Co., York, Pa.



Above: Ralph De Palma in the French Grand Prix Ballot. Right: Ralph De Palma and Mr. Ballot beside the racing machine designed by the latter for the French Grand Prix and next Indianapolis event



Boillot Will Drive Sunbeam in American and French Races

Ralph De Palma Probably to Pilot Ballot in California and Indianapolis Events

BY W. F. BRADLEY

European Correspondent of Motor Age

PARIS, Nov. 1—Andre Boillot has joined the Sunbeam racing department and will be at the wheel of a Sunbeam car in both the Indianapolis 500 mile event and in the French Grand Prix. Boillot has been connected with Peugeot since his school days, and, indeed, the whole Boillot family is attached to the Peugeot company in some capacity or other. It will be remembered that his brother George, who was killed during the war, had been connected with Peugeot during the whole of his career.

Sunbeam and Darracq are working together on their racing program, for the two firms are now combined. The cars are being designed by Louis Coatalen, but those bearing the name Sunbeam will be built in the Sunbeam shops at Wolverhampton, England, while the Talbot-Darracqs will be produced in the French factory of the Darracq company. It is not yet known who will be selected to drive the Darracqs, but Rene Thomas is spoken of as possible member of the team.

Ralph De Palma is visiting Paris in order to complete arrangements for his racing campaign with Ballot next year. It is understood that De Palma will drive a 3-litre Ballot in the California and in the Indianapolis events next year, and then will come to France to train for the Grand Prix. This week the Italian-American paid a visit to the proposed course in the suburbs of Strasburg, in order to get acquainted with local conditions. The set of roads picked out for the French classic constitute a triangle about 10½ miles around. The surface is excellent, there being a straight-away of

four miles, no grade crossings, no gradients, and only two villages of minor importance. The course is within 3 miles of the centre of Strasburg. In order to secure the race the Municipal Council of Strasburg has voted a subvention of \$50,000 to be given to the Automobile Club of France towards organizing expenses.

Next year's racing program of 183 cu. in. cars is likely to be well filled. Belgium has decided to hold a Grand Prix under these rules; there will be a similar race near Milan, Italy; England will have a 500 mile race on the Brooklands track and possibly another in the Isle of Man; there will be a big road race at Le Mans in the fall, and a 300 mile race for 183 cu. in. cars with touring bodies on the Island of Corsica during the first fortnight of April. This race has a first prize of 100,000 francs.

Dealers Increased Business Shows Value of Staging Shows

Rochester, N. Y., Nov. 11—A review of conditions in the automobile world in Rochester shows that the dealers were justified in going to the expense of staging the show. For instance, during the month of October, practically every automobile dealer in the city equaled in volume of business. The month of October was the largest in the sale of tires and accessories in the city since early summer.

November and December have never been record-making months, but the way business has opened up for the first week of the present month leads to the belief that November, 1920, is going to be at least a little unusual. Naturally, some of the interest is a direct result of the closed car exhibition, and that was one of the purposes of the show.

Taken all in all, the automobile business at the present time is better than ordinary, and every indication points to 1921 as a year of heavy buying, as was 1920 in the months of April, May and June.

Larger Demand for Tractors in Lumber Belt of Northwest

Value Under All Conditions Demonstrated to Operators—Call Is for Smaller Types

SEATTLE, Nov. 12—Tractor distributors in the Puget Sound country report an increasing demand for tractors in the great lumber industry of the Northwest. It is being convincingly demonstrated to the timber operators that the tractor, measured for all-year-round service, far outstrips the motor truck in logging operations reached by roads. While the motor truck has the advantage of speed, the tractor, it is contended, greatly overcomes this disadvantage in its great pulling power under the most severe circumstances, and its capability of handling much greater loads on attached trailers than the truck.

With logging operations to be greatly expanded in the Pacific Northwest, local tractor distributors are confident that the tractor will find a market of consistently increasing proportions in the woods.

Farm tractors have been moving fairly well this year, although not up to expectations. As soon as the atmosphere becomes cleared and markets become more stable, there is little doubt but that western Washington will begin to call for a substantial number of tractors. The great bulk of tractors in western Washington are the small models, there being little call for the larger types.

TRUCK SALES MANAGERS TO MEET

Chicago, Nov. 6—The Motor Truck Manufacturers' Association will hold a convention in Detroit in connection with the meeting of the Motor Truck Sales Managers Association on Nov. 18 and 19. Matters pertaining to the industry will be taken up and views exchanged on the problems of the individual members.

Show Open and Closed Models at Show in Des Moines 1921

On Account of Lack of Room Dealers Will Not Have Truck Exhibit

DES MOINES, IA., Nov. 12—Dates for the annual Des Moines automobile show were this week fixed for March 2-10 by the directors of the Des Moines Automobile Dealers' Association which sponsors and manages the show.

The forced return to the Coliseum where the show was formerly held until it went into the Ford Building two years ago has caused an innovation in the plans for the 1921 show. Next year's show will be in reality two complete individual shows as the open models will fill the Coliseum from March 2 to 6 and from the seventh to the tenth the closed car models will hold forth. The division of the show is made necessary by the lack of space in the Coliseum to house the entire show at one time.

The lack of room will also cause the abandonment of the truck show in connection with the Des Moines show. Officers of the Des Moines Motor Truck Dealers' Association say there are two reasons for giving up their show, first failure to secure quarters suitable for the show and second the fact that they do not believe that from a dealers' standpoint a show of inanimate models produces results.

Officers of the Des Moines Truck Dealers' Association say they will replace the show with several truck tours in the spring where they can show by actual work just what trucks will do.

BASSICK DISTRIBUTORS MEET

Chicago, Nov. 12—The Bassick Manufacturing Co., Chicago, manufacturer of the Alemite lubricating systems, has held its annual distributors' convention in this city, representatives attending from all parts of the country. During the convention, D. F. Fesler, general manager, announced the addition of two new accessories: Thomson's graphite penetrating oil and the Secret Service car lock. A feature of the convention was the distribution of a four-page newspaper containing cartoons, news and feature stories.

RECEIVER FOR ENJOINED COMPANY

New York, Nov. 13—A receiver has been appointed for the Holmes Mfg. Co. of Shelton, Conn., against which the Cameron Motors Corp. some time ago obtained an injunction forbidding the building or selling of any air-cooled engine embodying the essential features of the product of the Cameron company.

YOUNG TRUCK APPEARS

Cleveland, Nov. 11—Young Motor trucks, built in the plant of the Young Motor Truck Co., this city, made their appearance here last week. Offices of the corporation were moved into the plant last Wednesday, and the company ex-

pects to get into full production by Nov. 25.

The company was organized July 23. It has already built and shipped two of an order of twenty-five Young trucks, which are to be used by a company operating a silver mine in the Mexican interior. The Young truck is a duplicate of the Giant truck and is built under license to embody all the features of that make.

Exhibit Held at Shreveport Equals Other Southern Shows

Shreveport, La., Nov. 11—The Shreveport Automobile Dealers' Association is holding one of the best and most extensive automobile shows ever staged in Louisiana. Despite the fact that Shreveport is only about one-third the size of New Orleans, the local dealers have as many cars on display as were shown at the New Orleans dealers' show last year, which set a record up to that time in the South. The show started Nov. 2, and will continue up to Nov. 9. Sales from the floor are placed at \$122,000 for the show, which is considered unusual owing to the small territory, comparatively speaking, served by the Shreveport dealers, though the per capita automobile ownership here is one to every six persons within the city limits.

Trucks are constantly increasing in numbers and in uses in the Shreveport territory, both in the city and in Louisiana and Texas oil fields contiguous to this city. The truck exhibits, therefore, are attracting unusual interest, though by no means so large as they should or could have done. In the equipment division most of the attention and space was devoted to batteries and ignition and lighting systems. The tractor exhibit fell below expectations.

KEARNS HEADS TIRE COMPANY

Holyoke, Mass., Nov. 11—John Kearns, a former vice-president of the Fisk Rubber Co., has been named president of the newly incorporated New England Tire & Rubber Co., work on whose plant here is being rushed. Manufacture of Holyoke cord tires has already been begun in another factory under supervision of officials of the local corporation. This work will be transferred to the local factory as soon as it is completed. This is expected to be shortly after Dec. 1.

INVESTIGATING ERIE TIRE

Sandusky, Ohio, Nov. 12—Affairs of the Erie Tire & Rubber Co. are in the hands of an investigating committee consisting of C. H. Walters of Anderson, Attorney D. F. Dunlavey of Ashtabula, and Judge Spencer of Lisbon, members of the board of directors which will report in ten days. At the meeting of the stockholders last week Chairman Walters declared the company solvent. Accounts receivable amount to \$291,664.93 and the liabilities to \$281,043.81. Raw material, finished product, etc., is worth \$750,000.

Iowa Divided Into Districts in Campaign for Legislation

Series of Meetings Being Held in Connection with New Motor Vehicle Law

DES MOINES, IA., Nov. 13—In preparation for the battle which it expects to wage in the Iowa legislature this winter for a new motor vehicle law the Iowa Motor Trades this week opened a series of meetings which will be held at various points over the state at which the message of organized effort will be carried to the dealers of the state.

For conducting its general work, the Iowa Motor Trades Bureau has the state divided into districts of from seven to twelve counties each and the speaking campaign which is to arouse the dealers for the legislative campaign will be held in centrally located cities in each district.

The first meeting was held in Sioux City Monday night, A. J. Knapp, secretary of the bureau, F. D. Parmers, of Council Bluffs, and W. B. Swaney, of Ft. Dodge being the speakers. Mr. Knapp will make all the meetings and at different times will be assisted by various officers and directors. An extensive letter campaign among the dealers will precede the various meetings. Among the cities at which meetings will be held are Lemars, Ft. Dodge, Spencer, Osceola, Burlington, Des Moines, Postville and Davenport.

APPERSON PRICES TO REMAIN

Kokomo, Ind., Nov. 11—The Apperson Bros. Automobile Co., through its president, Edgar Apperson, to-day announced that Apperson prices will not be reduced.

"The present prices are guaranteed until July 1, 1921, and there is little likelihood of there being any change then unless it be an increase."

DEPRESSING STOCKS CHARGED

Cleveland, Nov. 12—Barton Pittman of Columbus has been held under \$2,000 bail for a hearing here after his arrest on a charge of having "unlawful intent to depress the value of the stocks and securities of the Templar Motors Co." He pleaded not guilty when arraigned. It is alleged that Pittman was able, by means of derogatory circulars, to buy up Templar stock at less than its market value and then re-sell it at a profit.

REO BUSINESS GOOD

Chicago, Nov. 6—According to Clarence E. Eldridge, local branch manager of the Reo Motor Car Co., Reo business in Chicago for October broke all previous records. He reports the delivery of 174 cars and speed wagons during this period, the number including wholesale and retail deliveries. Of this number there were 31 sedans and coupes, furnishing additional proof of the trend toward enclosed cars.

Urges Education of Public Along Normal Buying Lines

Should Be Shown Result Cessation of Purchasing Brings—Dealer Is Recommending Campaign

COLUMBUS, Ohio, Nov. 14—Y. B. Jones, head of the Mack truck agency in Columbus and also president of the Columbus Automotive Trade Association believes that a campaign to educate the public along the lines of normal buying of automobiles, trucks and tractors is a timely thing to take up at this time. Discussing present conditions in the automotive trade, he said:

"Publicity should be undertaken on the part of all dealers to show the buying public the invariable result of a cessation of buying of any article of merchandise. When buying is curtailed and the output of factories is reduced to 20, 30 or 40 per cent of capacity, the overhead calculated on each unit is heavily increased which must necessarily result in increased prices. I believe that normal buying should be carried on in all lines if it be automobile, trucks, tractors, clothing or shoes. These are ticklish times and as a result every one must be careful. Price reductions are going on and all price reductions must be handled wisely or ruin will result. Therefore, I believe that the public should be urged to buy normally in order to keep the business structure intact and prevent widespread trouble. I am urging my fellow dealers to undertake a newspaper campaign to show this feature to the public."

Interest of Kentucky Farmers Gained by Truck Dealers' Tour

Cincinnati, O., Nov. 15—Farmers' organizations in that section of Kentucky which recently was covered by the Cincinnati Truck Dealers' Association tours are manifesting more than a passing interest in power equipment for the farms.

The Farmers' League of Grant County sponsored a demonstration of power machinery for the farm at Dry Ridge a few days ago. One of the exhibits was a 1½-ton Paige truck with power take-off, sent down by the H. & T. Motor Car Co. Paige dealers in Cincinnati. Sales Manager A. B. Clark and C. W. Hutchinson accompanied the truck and gave an interesting demonstration to the farmers, who had gathered from several counties around for the demonstrations.

The use of trucks in farm work and their advantages were emphasized by the speakers.

COL. SMITH WITH REPUBLIC

New York, Nov. 11—Col. Frank E. Smith, well known in the automotive industry, has been elected a director and first vice-president of the Republic Motor Truck Co., succeeding W. J. Baxter,

resigned. John N. Willys, president of the company, says that the selection of Col. Smith was made necessary because neither Mr. Baxter nor himself is able to give the local situation the time that the business of the company demands. Col. Smith will act in the capacity of the direct representative of the president and board of directors. He has already arrived in Alma, Mich., and assumed his duties.

Service Station Is Feature of New Farm Power Company

Springfield, Ill., Nov. 12—The Farm Power Co., Springfield, has been incorporated to sell and repair tractors, trucks and all kinds of power farming machinery. A service station for trucks and tractors will be a feature. With the great increase in the number of trucks and tractors, the need of a service station with adequate machinery for making repairs and adjustments has been thought necessary and it is believed that the Sangamon county field will make such a company profitable. A suitable building is now being sought, and, if unable to find one, the company will erect a plant of its own.

Pierce-Arrow Busy on Plans for Production of New Lines

Buffalo, N. Y., Nov. 12—When his attention was called today to the drive being made in Wall street against the stock of the Pierce-Arrow Motor Car Co., the following statement was made by Col. Charles Clifton, chairman of the board of directors:

"The Pierce-Arrow Motor Car Co. has devoted recent months to preparation for production of new lines of both trucks and passenger cars. During this period shipments have been limited. The company will enter upon 1921 in an unusually strong position to secure a liberal volume of business. No new financing is contemplated."

RENAULT REAPPEARS

San Francisco, Nov. 6.—The Renault car is again in the San Francisco field. Following a lapse of several years the famous French motor car will again be merchandised locally, through a direct factory branch. This will be under the direction of M. Bosc. The first Renault model has arrived and is on display, and the branch is open for business.

AIRPLANES ADVERTISE NEW CARS

San Francisco, Oct. 9—Using an airplane to herald the arrival of the 1921 Buick models was the novel advertising method adopted by Charles Branaman, advertising manager of the Howard Auto Co., California Buick distributors. The plane distributed 50,000 leaflets announcing the new models, dropping them all over downtown San Francisco.

Arrest of President Not to Affect Hamilton Motors Co.

Charge Against Adolf Pricken in Connection with Sale of Stock in Warehouses

NEW YORK, Nov. 12—Adolf Pricken, president of the Hamilton Motors Co., of Grand Haven, Mich., and of the Coastwise Warehouses, Inc., in this city was held in \$50,000 bail today on an indictment charging him with grand larceny in the second degree. The real charge against him is that he operated a "get rich quick" scheme by the sale of stock in his warehouses. His arrest disclosed that he had served two prison terms but that he began life anew five years ago and in the interim has accumulated a fortune estimated at more than \$1,000,000.

A dispatch from Grand Haven quotes W. G. Jarman, treasurer and general manager of Hamilton Motors, as asserting that the arrest of Pricken will have no effect on the affairs of the company. Jarman declared Pricken would be ousted from the presidency as soon as action can be taken. He denied that Pricken was the financial backer of the company but asserted that he was elected president last March upon his agreement to take a considerable portion of the stock. This stock agreement never has been fulfilled, Jarman declared.

Hamilton Motors has been operating about three years, making a few Apex trucks each month, but has been down for the last two months and still is out of production.

Stock Sold in "Paper Companies"

In connection with his warehouse venture, Pricken organized the Thirty-fourth Street Stores, Inc., Washington Street Stores, Inc., Charlton Street Stores, Inc., and Jayne Street Stores, Inc. As the result of investigations made by the district attorney of Kings county of complaints made by stockholders it has been found, it is alleged, that some of the corporations in which stock was sold were "paper companies" and their securities worthless.

District Attorney Lewis said many persons bought this stock upon the representation that it would return guaranteed dividends of 50 per cent a year. He stated that about \$500,000 worth of stock was sold and that the purchasers were widely scattered, some of them living as far away as Maine.

Pricken served a term in Pennsylvania for a \$25,000 forgery and another in Sing Sing for a series of thefts from Park & Tilford, it was asserted in court. He maintains two homes in New York as well as a country estate.

His attorneys deny he ever promised 50 per cent return to investors but did pledge 1 per cent a month, promising to buy stock back at par. It is understood his warehouses have been very profitable.

Prices of Goodyear Tires Cut; Other Companies Follow Action

Ajax and Miller Among Concerns to Make Reductions—Other Manufacturers Stand Firm

NEW YORK, Nov. 12—The lead in what is expected to be a general reduction in tire prices, has been taken by the Goodyear Tire & Rubber Co. which yesterday officially announced a cut of from 3 to 14 per cent on nearly all sizes tires and tubes, effective Nov. 15. Reported reduction in Goodrich prices were denied at the executive offices in New York, and Firestone and Miller offices in Akron said there was no price announcement to be made.

The Goodyear cut is not a flat reduction in all sizes but reaches 15 per cent at its highest point. On all-weather tread cord casings the cut is 7½ per cent, 10 per cent is dropped on straight side fabric all-weather casings, and irregular reductions ranging from 3 to 14 per cent on clincher fabric tires. Rubber tread casings, both cord and clincher fabric, now list at the same price as all-weather tread casings except on the 30 by 3½ clincher cord casing. Extensive improvements have increased manufacturing cost on this tire, officials say and no reduction is possible.

Regular tubes are reduced 15 per cent and heavy tourist tubes 10 per cent. There is no reduction in price on "tire savers," repair material or motorcycle casings or tubes.

Ajax Rubber Co., Inc., New York, will reduce prices 10 to 15 per cent, effective Nov. 15. The reduction is made, President de Lesser declares, to increase the volume of business. Though the company with others is suffering because of the depressed buying, he asserts it is still operating on a profit. Factories of the company are at Trenton, N. J.

B. F. Goodrich Rubber Co. has announced immediate reduction in tire prices ranging as high as 15 per cent and in some instances approximating 20 per cent, depending on the size and construction. The cuts include all tires, solid and pneumatic, and tubes.

Miller decreases range from 3 to 15 per cent. On cord tires the reduction averages 12 per cent and from 10 to 12½ per cent on fabrics. Tubes have been cut on an average of 15 per cent.

CADILLAC INCREASE

In the percentage of increase table published in MOTOR AGE under date of Sept. 2 it was stated that the Cadillac had increased \$970 in price from Aug. 12, 1918, to Aug. 12, 1920, or 33 per cent. The increase was \$720, or 22.36 per cent.

KELLY TRUCK TAKEN OVER

New York, Nov. 15—The Kelly-Springfield Motor Truck Co. and its big plant at Springfield, Ohio, have been taken over by Hare's Motors, Inc., the operat-

ing organization for the Locomobile, Mercer and Simplex companies.

Co-incident with this announcement is another to the effect that the directors of the Kelly-Springfield company have elected the following officers: President, Emlen S. Hare; vice presidents, Henry Lansdale, H. D. Church and O. E. Hunt; secretary and treasurer, F. R. Hickman. These men now hold the same respective positions in Hare's Motors, the Locomobile Co. and the Mercer Motors Co.

New Police Chief to Rid Chicago of Car Thieves

CHICAGO, Nov. 13—Intent on riding the city of automobile thieves, Chief of Police Charles Fitzmorris the second morning after he had assumed office inaugurated an investigation of conditions, the first step in an active crusade to that end.

"I am going to get a summary of the whole automobile situation," he said. "I want to know how many automobiles have been stolen, where they have been stolen from, how many have been recovered and how many automobile thieves have gone to jail. When I have that data in hand I'll know what I'm going to do next. One thing is certain now. It is that altogether too many automobiles are vanishing and that the robberies must stop."

James L. Giddes, who has been president of the Kelly-Springfield Company, has been elected chairman of the board of directors.

MORE HARVESTER TRUCKS

Akron, O., Nov. 15—The Akron plant of the International Harvester Co., building motor trucks, announced today a 20 per cent increase in production, the new schedule effective immediately. The announcement followed a visit to the works of M. A. Jones, Chicago, assistant manager of automotive works. The tire industry is interested in the announcement as it means additional orders for truck tires of all kinds.

A. J. REED DIES

Cleveland, Ohio, Nov. 15—The many friends of A. J. Reed in automotive circles will be shocked to learn of his sudden death at Ravenna on Nov. 5. While he and his little son were driving in a pony cart they were struck by an interurban car, the little boy being killed instantly and Mr. Reed dying a few hours after.

Mr. Reed was general manager of The Perfection Piston Ring Co. of Ravenna and was one of the founders of the business. He was formerly connected with the United States Piston Ring Co. of Cleveland. He is survived by his wife and two little girls.

Reserve Bank in Atlanta Makes Change in Rate for Borrowing

Suspends Basic Line and Progressive Rate for Flat Rate of 7 Per Cent

ATLANTA, GA., Nov. 12—The Federal Reserve Bank of Atlanta has announced suspension of its basic line and progressive rate for borrowing and has submitted therefor a flat rate of 7 per cent. The change is now in effect.

That this revision of rates will serve to extend credits is the opinion expressed by bankers and financiers here familiar with such matters. They say that the basic lines of the individual banks marked the dividing point between sums they could borrow at 6 per cent and the sums on which progressive rates were charged. The basic lines were determined for each bank upon a basis of its average reserve balance and its investment in Federal Reserve Bank stock.

The opinion expressed by officials of the Federal Reserve Bank that the removal of this basic line and the substitution of a flat 7 per cent rate would be welcomed by the member banks, notwithstanding that it would raise the rate on small loans. On the other hand, it will greatly loosen lines of credit and lower the rate on heavy loans.

WESTERN CANADA TO HOLD SHOW

Winnipeg, Man., Nov. 15—At a meeting of automotive jobbers, manufacturers' representatives and local manufacturers it was decided that western Canada would put on an automotive equipment show the second week of the Bonspiel, Feb. 14 to 19 inclusive. This show is to be known as the Western Canada Automotive Equipment Show and will be similar to the equipment shows held in the states and elsewhere but perhaps on a slightly smaller scale. Arrangements are now being made for space which information will be ready within the next few days.

Chevrolet to Drive at Final National Championship Race

Los Angeles, Nov. 15—The final race of the 1920 national championship will be run on the board oval at Beverly Hills, Thanksgiving Day. Already a number of the drivers are here in preparation for the event. The season opened on the same track last March and practically the same field of drivers will participate. The principal addition to the list will be Gaston Chevrolet, who never has driven on the local oval. Considerable interest has been created in the event. There is a probability of an aircraft show and demonstration in connection with the race. However, some opposition to this is developing as stunt flying over a field of racing automobiles and thousands of people is not thought much of in these parts where airplane accidents are frequent.

Goodyear Tire Program of Refinancing Is Concluded

Reorganization Plans Perfected—No Interruptions in Facilities of Sales Department for Deliveries

AKRON, O., Nov. 13—Official announcement was made today by the Goodyear Tire & Rubber Co. that the company's program of refinancing to the extent of \$25,000,000 had been consummated successfully with a group of leading American banking interests headed by the Goldman Sachs Co. of New York. In an official statement issued today by the company to all its division and branch managers, L. C. Rockhill, general manager of sales, says:

"We have seen our sales dropping off because automobile and truck manufacturers were cutting production and because dealers were reducing stocks and refraining from the usual stock replenishment. As business continued to decline it became necessary for us to reorganize our sales force and to assign many executives to more definite sales tasks and to enlarge territories so that we could operate with reduced sales personnel. The reorganization plan has now been perfected and we have just arranged with a group of banking interests to supply us with \$25,000,000 of additional finance which will be adequate to carry us over the period of depression.

"Naturally banking interests require security for the funds they are advancing to us and this has been arranged in an admirable manner by assigning to them our inventories of finished product. This arrangement places no incumbrances on our plant or equipment and in no way affects the ownership, or management of the business.

"Arrangements are being made covering the handling of stock under the new financing plan but there will be no interruption in the facilities of our sales department for making prompt deliveries to customers. We will be able to meet our obligations promptly and we can proceed to pursue sales with confidence that when this period of depression is past the prediction we made four months ago will come true that Goodyear would emerge from the period in a stronger position in the trade than ever before. The company now is in a more secure position than it has been for months and there are plenty of assets back of every share of stock in the company."

NELSON MOTORS PETITIONS COURT

Detroit, Nov. 12—The E. A. Nelson Motor Car Co., which recently was reorganized as the E. A. Nelson Automobile Co., a Delaware corporation, filed a petition in bankruptcy in the Federal Court today listing liabilities of \$73,166.65 and no assets other than personal property of undetermined value. Of the total indebtedness \$66,946.52 represents unsecured claims and the petition lists

among other debts approximately \$5500 due the government as taxes on automobiles manufactured and approximately \$720 city and county taxes. Officials of the company said today the petition was filed with the view of having the court fix liability for the indebtedness between the old and new company and declared the present company would continue operation as soon as the court had rendered its decision.

The former company was organized four years ago but encountered financial difficulties in the early part of this year.

"Transport" and Not "Transportation" Says Federal Bureau

WASHINGTON, Nov. 15—Transportation is transportation just as "pigs is pigs." There is a difference between hauling goods on a railroad and hauling the same goods on a motor truck. That difference now has been defined and a fresh meaning for another word goes into the dictionary automatically. Here is the difference:

Transport refers to merchandise transported by motor vehicles.

Transportation refers to merchandise transported by the railroads.

The definition is authoritative for it has been adopted by the Highway and Highway Transport Committee of the Federal Bureau of Education.

at which time the liabilities were assumed by the reorganized company under the terms of the stock agreement. The plant has been out of production three months.

Louisville Dealers Start Plans for February Show

Louisville, Ky., Nov. 13—Tentative plans for the Louisville Automobile Show, which will be held at the Armory during the week beginning Feb. 21, have been adopted by the Louisville Automobile Dealers' Association, it was announced yesterday.

CUT IN GASOLINE PRICES

New York, Nov. 15—Announcement of a reduction of one cent a gallon in tank wagon prices of gasoline in states in which the Standard Oil Co. of New Jersey and the Standard Oil of Louisiana operate is made by the New Jersey company. It will become effective tomorrow. The states include New Jersey, Maryland, Virginia, North Carolina, South Carolina, the District of Columbia, Louisiana, Tennessee and Arkansas. The reduction in price is said not to reflect lower costs but to be merely a move on the part of the companies to aid in the lowering of prices as part of the general commercial readjustment. Prices of tank wagon gasoline will vary in the different states because of the difference in freight costs. No prediction was made as to the effect upon retail prices.

American Sedans Win Approval at Olympia Show Just Closed

Open Cars Criticised for Lack of Seating Comfort and Quality of Body Work

LONDON, Nov. 12—(Special Cable)—The Motor Show which closed at Olympia tonight ended with business better in trade prospects than was apparent at the outset. The volume of actual business steadily improved, prospective trade being the bigger feature. The demand was mainly for light cars apparently because of price, new taxation and elimination of paid drivers. Business in medium priced cars was moderate but difficult to gauge because there has been much silence regarding it. The call for big automobiles is slumping; many owners say they must buy small cars and lay up the larger ones because of the expense involved in operating.

Much of the blame for lack of business was blamed on the government because of its action in increasing taxation on horsepower rating. An effort probably will be made to have it reduced by half but it seems too late to get action for the next fiscal year.

American sedans won much approval at the show. They were more roomy than the others, their appearance was good but the open American cars were criticised for lack of seating comfort and the intrinsic quality of the body work. These cars were held to be too dear as compared with European cars of the same class.

Business prospects are not expected to declare themselves before the new year as price deductions may be looked for at that time. Dealers and the public are holding back in this belief and because of the present financial strain. Improved trade and the promise of normal business stability will decide the fate of many motor concerns here. Altogether the situation at the close of the show is more hopeful but far from satisfactory and not comparable with conditions at the end of the 1913 show.

The comparative absence of commercially useful novelties at the show has led old hands here to discuss the possibility of motor shows meeting the fate of the bicycle shows. They hold that the only justification for motor car displays is the business element. Next year's show probably will go far to decide the future of motor expositions or at least of annual displays.

NEW MILLER TIRE BRANCHES

Akron, Ohio, Nov. 13—The Miller Rubber Co. has opened tire branches in Minneapolis and Washington. The former branch will be managed by J. E. Lewis and will cover the states of Minnesota, North and South Dakota, Montana and parts of Idaho and Wisconsin. The Washington branch is in charge of E. T. Sloan and will cover the District of Columbia and the state of Virginia.

Independent Organization to Handle Sales of Chrysler Car

Product Not to Be Sold Through Willys-Overland Organization Sales Offices Opened

ELIZABETH, N. J., Nov. 12—The Chrysler Motor Co. has been organized to take over the sale of the new Chrysler car, when manufactured, and to establish a distributor and dealer organization on an independent basis. General sales offices have been opened at the home plant here and the organization which will handle the distribution of the five to six hundred cars per day production to be built by the Chrysler plant is rapidly assuming definite shape. It has been generally assumed that the car would be sold through the Willys-Overland sales organization, Overland distributors handling the product.

Although it will be well along in the spring before the factory will be producing cars, territorial applications are being received and it is expected that by January the new sales plans will take form and distributor appointments be arranged in some of the larger cities where the first of the Chrysler product will be shown.

The plan, which is being formulated by E. B. Wilson, general sales manager of the Chrysler Motor Division, Willys Corp., contemplates the establishment of distributing points to keep pace with production rather than a general distribution of sample cars over a wide area of territory with a resultant wait for the delivery of cars in appreciable quantities, a policy that will no doubt make a distinct appeal to the trade. With large production the whole country will soon be covered although it will mean a lapse of some months from first production before general distribution is effected.

Harder Work Needed in Used Car Business, Dealers Hold

Los Angeles, Nov. 13—The used car situation here remains bad. It is the direct result of the recent price upset and at this time the dealers say they cannot approximate the time when improvement will be shown. Price uncertainty has made the trade in a very skeptical value with the new car dealer and the exclusive used car dealer is finding troubles more numerous than ever. Harder work is the only thing that will keep the used car business on its feet, in the opinion expressed today by some of the leaders. Accepting a used car of less value as part payment on the sale of another used car has become almost a thing of the past when the second car has been carrying a fair price. If the dealer had overpriced it purposely to allow of a trade-in margin he still can get by with this procedure but to a more limited extent.

The accumulation of new cars that are being put into storage is not helping the used car market. A large percentage of the public holds to the belief that

some day there will be applied a reduced price to these cars in warehouse and that will give owners of used cars a better chance to trade for new cars than for other used cars. From the general indications today it may be safely predicted that this winter the wreckers are going to do a thriving business in cars that no longer have a real marketable value.

Bankers Work With Dealers to Teach Buying Conditions

MILWAUKEE, Wis., Nov. 15—Milwaukee bankers are co-operating with retailers in all lines in a three-weeks' campaign of education of the public as to the fundamentals of present conditions in relation to purchasing, and excerpts of the statements made by the bankers will be used as parts of local newspaper advertisements by dealers in automobiles, tires and accessories just as they will be used by dry goods merchants and grocers. The First Wisconsin National Bank has offered its facilities for the purpose of centralizing the entire effort.

An initial shot in the campaign was an interview given by Oliver C. Fuller, president of the bank. He said: "It is too much to expect the return of 1914 prices. We are doing very well to have a price level which is about that of the beginning of 1917. Not in a generation have prices taken so much of a slump in so short a period. It was only natural that when the decline began, purchasers should hold off for lower prices. But who knows whether the decline will continue, or if the scarcity caused by low production due to a refusal by the public to buy, may not cause a renewed upward trend? The wise buyer will not speculate either in the rise or fall of prices, but buy as needs require."

NEW TRACTOR COMPANY FORMED

Stevens Point, Wis., Nov. 15—A. J. Patch, formerly chief engineer of the Hart-Parr Co., Charles City, Ia., has organized in association with a number of prominent Wisconsin business men a new corporation known as the Farmers' Tractor Corp., with an authorized capitalization of \$500,000. It has selected Stevens Point, Wis., as headquarters and next spring will build a machine shop and assembling plant, later adding a foundry. William Mainland of Oshkosh, Wis., is assisting Mr. Patch in the organization. The new tractor will be known as the M. P. M.

PIERCE-ARROW HAS NEW MODELS

Buffalo, Nov. 12—At the close of a factory convention at which the new product was introduced to the members of the company's sales organization, the Pierce-Arrow Motor Car Co. announced a complete line of new dual-valve passenger car models. The open models of the new product include a runabout and four, six and seven-passenger cars. The closed cars are the limousine, coupe-sedan, sedan, vestibule sedan, brougham and landaulet.

National Shows This Winter Will Be Biggest in History

Manufacturers Unite to Make Events Success—Boom to Sales Expected to Result

NEW YORK, Nov. 15—Concerted and united effort on the part of manufacturers to make the national automobile shows this winter the greatest ever held was decided upon by the directors of the National Automobile Chamber of Commerce at their monthly meeting here. This effect will be concentrated in an advertising campaign designed to promote sales and to enthuse dealers. Most car makers will use very liberal space in the period around show time. Their appeal will be directed not only to potential purchasers but to their dealers upon whose efforts so much of their own success depends. In the aggregate the campaign probably will be one of the biggest ever conducted by the industry.

Dealers are expected to attend the New York and Chicago shows in droves and the manufacturers will take advantage of every opportunity to infuse into them an enthusiasm and optimism which cannot fail to bring results in actual sales. There is a conviction throughout the manufacturing end of the industry that the volume of sales which will result from the coming shows will be sufficient to send factories ahead at full steam and the present slump will soon become only give the industry such an impetus that a memory.

Plan "Pep" Program

Almost every manufacturer is already making plans to put "pep" into his dealers. In most cases this will take the form of dinners at which there will be inspirational speakers. Pending the completion of these campaigns aggressive work is to be started at once. Assistance and encouragement will be given to dealers and they will be vigorously supported in their sales efforts. Several factories have already instituted such work with good results.

Conservative optimism marked the meeting of the directors. They were convinced that by the end of the shows the industry will be well on the way to normal but they have no illusions as to the problems which still confront them. They expect it will take some time to work out these questions. Most of them are financial in their nature and involve keeping their organizations and plants mobilized for instant action when the right time comes.

A committee representing the Motor & Accessory Manufacturers' Association conferred with the directors with the result that there was a further strengthening of the co-operative spirit. It was conceded that each branch of the industry must bear its share of the burdens at this time and there was considerable discussion of means by which each could be helpful to the other.

Only Association Members to Exhibit at Los Angeles Show

Dealers' Organization Decides on Holding Display This Year Against Truck Segregation

LOS ANGELES, Nov. 15—Last fall, in midwinter and during the spring months, the Los Angeles Motor Car Dealers' Association held out against holding a show. It was said at that time that business was so good a show was unnecessary. A few days ago it was decided to hold a show and the ten days from Dec. 11 to 20 were chosen as the date. This action upon the part of the association may be regarded as indicative of the state of business at this time.

It has been agreed to limit the motor car and truck exhibitors to membership in the association. Accessory dealers who are not members will be allowed to buy space, which will be sold for \$1 per square foot. The first few days that the space solicitors were on the row they disposed of about 65,000 sq. ft. Half of the total charge must be paid with the order so it can be seen the association is not going begging for funds to start work with. It is the intention to make this show the most elaborate ever held on the Pacific coast.

Some of the truck dealers, members of the association, are opposing a segregated truck show. It is a well known fact, proven by experience, that the public will not pay much attention to an exclusive truck department. The truck dealers feel they are entitled to the entire patronage the same as passenger car exhibitors and for this reason have asked that the trucks be awarded spaces in common with passenger cars and not relegated to the basement, the roof, shown with accessories or concealed behind posts as no cut rates are offered them. At this time a decision on the issue has not been arrived at.

Space limitations are assigned as the reason why non-association members are not being offered show space. In the past non-members have been invited to exhibit at the regular floor space rate but they did not share in rebates based upon profits as the association members did.

WEST VIRGINIA FOR GOOD ROADS

Charleston, W. Va., Nov. 15—Early reports indicate that the good roads amendment has been ratified by a majority of at least 100,000. This is greater than the prohibition amendment ratified in 1912 and compares with the majority defeating the suffrage amendment in 1916.

MILWAUKEE NOW TRANSFER POINT

Milwaukee, Wis., Nov. 15—Milwaukee has been designated as an important transfer point for lake-and-rail shipments of motor cars from Detroit to the West. Recently the Chicago and Detroit Steamship Co. added Milwaukee to its ports of call and now it has received

instructions from Dodge Brothers to make Milwaukee the place of transfer to all points west, instead of Chicago. This will mean that the railroads out of Milwaukee will handle more than 400 cars weekly for shipment west. As navigation closes within a few weeks, the volume this year will not be large, but the Dodge Brothers contract will be effective throughout 1921 and indefinitely thereafter.

DRAW FOR TRUCK SHOW SPACE

New York, Nov. 13—Drawings for the exhibitors' space at the Highway Transportation Show to be held in this city from Jan. 3 to 8, 1921, will be made on Nov. 18, at the Automobile Club of America. Those having contracted for the largest amount of space will be permitted to draw first, and so on down the list of exhibitors until all the space has been taken. The show will be held in two buildings, the 12th Regiment Armory and the First Field Artillery Armory. Each of these buildings has a floor space of approximately 25,000 ft. available for exhibits.

California Trades Secretary Finds Prospects in State Good

San Francisco, Nov. 12—Robert W. Martland, state secretary of the California Automobile Trades Association, has returned from his tour of the state. The veteran trade association executive is more enthusiastic than ever over the work of the organization and the prospects for a great year.

"The association members are pulling together even better than ever before and this sort of co-operation makes all the difference in the world. In Los Angeles, one of the best meetings ever held by the association took place during my visit in that city.

"We are now planning for the November meeting of the association. This will be held in Bakersfield and promises to eclipse even the Los Angeles gathering.

Bondholders Committee Takes Over Speedway at Sharonville

Cincinnati, Nov. 15—After several months of uncertainty, a committee representing the bondholders has taken over the property of the Cincinnati Speedway at Sharonville for a consideration of \$81,000, the lowest figure at which it could be purchased under Court order.

The sale means that persons holding \$500,000 in stock of the old Speedway company will receive nothing and that bondholders owning \$200,000 in bonds will receive only what they may realize from the property, with whatever use they plan to make of it. The bondholders paid \$25,000 in cash and will pay the remainder in cash or in bonds at a valuation to be determined by the Court.

The Speedway was used for automobile races until these were abandoned during the war. In war times it was used as a concentration camp for Cincinnati soldiers. Several efforts to dispose of the property since the war have been futile.

National Highway Government Built and Maintained Favored

N. A. C. C. Committee Presents New Platform to Supplant Original of 1912

NEW YORK, Nov. 15—A new platform constituting a declaration of its principles on the subject of highways has been presented to the Highways Committee of the National Automobile Chamber of Commerce by Pyke Johnson, secretary of the committee. It will supplant the original platform which was adopted in 1912 and is designed to meet more modern conditions.

The platform asserts the belief of the N. A. C. C. in a national highway system built and maintained by the government, with inter-county or state systems maintained by the states and district or county systems maintained by the counties.

It declares that motor registration fees should be set aside for maintenance uses instead of construction inasmuch as registration fees are recurrent and maintenance charges constitute a recurrent tax. It also declares for an adequate centralized engineering control with the personnel adequately paid. Snow removal, the platform asserts, should be an ordinary item of maintenance. Another plank calls for the systematic and scientific development of highway engineering.

Importance of maintenance is one of the chief points covered in the new platform. It is intended that there should be a traffic engineer in every state highway department in the country. A constructive program for the guidance of every interest in the country devoted to the development of improved highways will be considered at a meeting to be held in Washington next month under the auspices of the Bureau of Roads.

The highways committee discussed at considerable length the status of the Townsend bill which will be called up in committee at the coming session of Congress. Unless action is taken on it at this session it is highly unlikely there will be any federal legislation before 1923 because the impending extra session will consider only major questions such as peace and taxation and there will be no time to take up highway legislation at the short session which will follow. It is hoped that authorization will be given at the coming session for the appointment of a Federal Highway Commission to lay out a system of roads and then get appropriations to build them at some later date.

The motor truck committee of the N. A. C. C. at its session discussed the problems peculiar to that branch of the industry, particularly the problems of the used truck which is interfering seriously with sales of new vehicles. An investigation also was begun to learn the source of propaganda which is being carried on in country newspapers against the motor truck on the ground that it is destroying highways without bearing an adequate tax for their maintenance.

More Action and Business on Good Lines Aims of Convention

Program of Ohio Automotive Trades Association to Stir Dealers—Neighboring States Invited

CINCINNATI, Nov. 15—Because every woman plays an important part in the business of her husband, all sessions of the fourth annual convention of the Ohio Automotive Trades Association, which opens December 7 at Music Hall, will be thrown open to the ladies.

Special entertainment features will be introduced for the women so that they may divide their time between the regular sessions and the entertainments.

Committees arranging for the convention are expecting a record-breaking attendance. Invitations are to be extended to dealers in Indiana, Kentucky and West Virginia, because of Cincinnati's importance as a distribution center for these states and at least 1,500 dealers are expected from these states, as well as an equal number from Ohio.

Manufacturers will display their products and jobber members will be permitted to take space for dealers, but will not be allowed to exhibit anything.

"The business is here and no other industry has as bright a future as that of the motor vehicle," says E. J. Shover, secretary-manager of the State organization. "While 1921 will be a banner year, we must go after the business.

"Therefore, our entire program of speakers and round table discussions will be conducted along lines of stirring the dealers to action, not only in getting sales, but in conducting their business along good business lines."

TO KEEP DETROIT ROADS CLEAR

Detroit, Nov. 12—Roads adjacent to Detroit will be kept clear of snow this winter permitting all season automobile and truck traffic, according to F. F. Rogers, state highway commissioner. Especial attention will be given the roads leading from Detroit to Toledo, Flint and Mt. Clemens. The state will pay 60 per cent of the cost and the counties the remainder. Commissioner Rogers said today full co-operation of the counties interested had been promised.

Business Men Buy Day's Output at New Chevrolet Texas Plant

Fort Worth, Texas, Nov. 11—Fort Worth business men evidenced their appreciation of the location of the Chevrolet Motor Co.'s big plant by purchasing an entire day's output of cars on the fourth anniversary of the establishment of the plant here. The Chamber of Commerce and twenty-five business concerns each made a purchase.

Shortly before noon the twenty-six cars were lined up in front of the Chamber of

Commerce where the purchasers and about one hundred other business men assembled. They were carried to the Chevrolet plant in the new cars, and partook of a luncheon there.

The affair was planned by directors of the Chamber and much of the credit for its success is due to Walter Beck, local distributor of Chevrolet cars.

R. S. Townsend, manager of the Fort Worth plant, announced that considerable additional territory along the Mexican border as well as a part of old Mexico had been added to the territory served by the sales office of the Fort Worth plant. This, it is believed, will result in an extension of the plant as the company, since the erection of the present building, has purchased considerable ground adjoining it.

Used Car Dealer in Favor of Central Market in Each City

Jacksonville, Ill., Nov. 12—At a regular meeting of the Jacksonville Automotive Dealers' Association, an address was heard from B. B. Burns of Decatur, Ill., who was the first man in central Illinois to open an exclusive used car establishment and who has built up a very large business. In the course of his remarks, the speaker explained his methods of appraising a car offered to him, how he treats it after purchase so that it will readily sell after the rehabilitation, and also his methods of advertising.

He brought out many new and ingenious ideas, all of which have been carefully tried and tested and have proven to be successful. Mr. Burns believes that one central used car market in each city is the most satisfactory way to handle motor vehicles, the large stock giving a prospect such a diversified assortment that no difficulty would be experienced in finding one that would fit into the needs and purse of the buyer.

EISEMANN SHOWING FILM

Brooklyn, Nov. 6—The Eisemann Magneto Corp. has produced a moving picture, entitled "Why the Magneto," which is 2000 ft. in length and purely educational in its scope. It has been shown to numerous universities and agricultural colleges and schools that maintain automotive mechanics' courses.

MOORE CLAIMS MUST BE IN DEC. 1

Danville, Ill., Oct. 25—Creditors of the Moore Motor Vehicle Co. of South Dakota and the Moore Motor Vehicle Co. of Illinois have been directed by the federal court for the eastern district of Illinois to file their claims with C. B. Thomas, the receiver, not later than Dec. 1. Failure to do so will debar them from participating in the distribution of assets.

STUTZ PRICES INCREASED

Indianapolis, Nov. 4—The Stutz Motor Car Co. of America, Inc., announces that new prices effective today are as follows: Roadster and Bearcat, \$3500; four and six passenger, \$3600.

Public Schools for Mechanics Recommended by Ohio Official

Appreciating Importance of Industry Trade Supervisor Would Have Courses Throughout State

CINCINNATI, O., Nov. 15—E. L. Huesch, Supervisor of Trades and Industries for the State Board of Education of Ohio, is a strong booster for the development of courses for automobile mechanics in the public schools of Ohio.

On his continuous trips of inspection over the state, Mr. Huesch is urging other school districts to adopt the Cincinnati plan of teaching boys to become mechanics through the medium of the public schools. In Cincinnati, the Board of Education has established an Automotive Trades School, with free instruction for the pupils.

Mr. Huesch gave his views on the subject of public school instruction for automobile mechanics when in Cincinnati a few days ago to ask John F. Arundel, director of the work here, to speak at the State Teachers' Association meeting in Columbus in December and outline his plan of operation for the benefit of other school districts over the State.

"The automobile industry is one of the largest and liveliest in the State and the development of mechanics for such an industry is one that should be encouraged by the public schools," Mr. Huesch said.

"Pupils are educated for the various professions to become physicians, lawyers, etc., and there is no reason why they should not be given an education in the mechanism and repair of an automobile, so they may become automobile mechanics. The Y. M. C. A. has been successful with such courses, even charging a tuition fee, and they should be taken up more actively by the public schools and put on a free basis. Hundreds of boys are going into this work and they should be given the opportunity to acquire knowledge of their subject."

Mr. Huesch asked Mr. Arundel to appear before the state association because of numerous requests from other districts seeking information about schools for automobile mechanics. At least half a dozen Ohio cities will have automobile trade schools next year, and others are laying plans for opening them later, Huesch said. Columbus plans to open a large school of this kind early in the year.

DEALERS MUST CLOSE ON SUNDAY

Columbus, Ohio, Nov. 6—The police department has received instructions to see that all motor car sales rooms are kept closed on Sundays, in accordance with the city ordinance. It is claimed that the ordinance has been violated in a number of instances. Repair shops and public garages are permitted to be open on Sundays according to the ordinance.

Automobile Insurance Rates Receiving Renewed Attention

Drop in Prices of Cars May Result in Changes in Used Car Insurance Premiums

MILWAUKEE, Wis., Nov. 15—Viewed from the position of the automobile insurance man, there is a fair amount of business at the present time, somewhat more than was expected as the result of popular reports as to conditions. The insurance man, taken as a body, says that sales of new cars are having the best of it, compared to used cars. The rate with which new business is coming in is satisfactory for this season, they state.

With the election over, and the insurance man thinking about the possibilities of new legislation, the matter of rates on automobiles is receiving renewed attention.

A Milwaukee fire insurance man sums up the opinions of a conference just held privately: "Automobiles have been improved so much mechanically, that defects along these lines from our viewpoint are negligible. There is no danger of any consequence from faulty construction, whether the cars are expensive or low priced. Our records showed that most fire losses occur in garages where cars are stored. In our opinion there should be a flat charge for fire coverage. It is fair enough to base the collision and theft premiums upon the combined experience tables of the companies writing these two classes. We propose to make a strong fight for flat fire rates. If we have our way there will be one class for fire insurance for which a charge of 1 per cent will be made, including cars of whatever price and cars one or two years old. We want only one other class, namely, one for all cars over two years of age, the rate on which will be 1½ per cent."

A feature causing some concern in automobile insurance circles, is the fact that many used cars bought in recent months were heavily mortgaged and bought at the higher scale of prices.

"I would not be surprised," one agent said, "that many agencies will adopt the policy of calling in and cancelling automobile policies, rewriting them on present day values. Insurance men everywhere are being warned by their companies to be very careful and guard against a heavy loss ratio."

However, with the sales of used cars at low ebb, most of the insurance men are not so fearful as the Milwaukee man quoted in the above.

Des Moines Dealers Announce Plans for Expansion of Room

Des Moines, Iowa, Nov. 12—In spite of the haze which has hung over the motor car business during the past few months two Des Moines dealers this week made announcement of plans of expansion. Al Miller, Apperson distributor, announced the construction of a two-story

building in the row on Locust street which will be one of the finest sales-rooms and service stations in the state. The building will be completed early in the spring. Mr. Miller now distributes Appersons in six states and on Jan. 1 will take over the Chicago agency.

The building now occupied by the Iowa Apperson Co., which was built a few years ago to house the Studebaker

branch, will be taken over by the Sears Auto Co. and will be used exclusively to house the Dodge agency. The Sears company will retain its present sales-rooms at Tenth and Locust street, for its Reo, Jordan and Stewart truck business. Growth of the Dodge business in the territory controlled by the Sears Auto Co. has made the additional quarters necessary.

Facts About the Paint Coat on Motor Cars

(Concluded from page 13.)

water until the desired uniform level is obtained. The rubbing stone, as generally used, is a small block of sandstone about the size of a cake of soap. It is quarried in Indiana, and is adapted to the

There is another class of SURFACERS known as SANDING SURFACERS which are sanded to a smooth surface instead of being rubbed. Another one, the name of which is familiar to all, is PUTTY—not the ordinary kind that you have perhaps used for glazing a window, but a special quick drying kind, made from dry white lead, coach japan, and rubbing varnish that dries hard and can be sanded.

The LEAD FILLERS constitute another group of surfacing materials. Rub-lead, used chiefly on open grain hard woods, is rubbed into the grain with the palm of the hand—hence the name. Knifing-lead is knifed onto the surface with the putty knife, and is made and handled in a similar way to putty.

Whatever the material used, it must be sufficiently viscid to fill all defects as it is intended to. It must dry with a film that can be ground down evenly with the rubbing stone or sandpaper, and its elasticity must be such that it will match that of the adjoining coats.

COLORS

Having established a smooth surface, the next step in the work is to properly decorate this surface, and this is begun by coloring it to suit the taste. The pigments that constitute the source of color are made suitable for use in automobile painting by grinding them in a special japan. For all ordinary purposes they are ground in linseed oil, but oil paints are too soft for automobile work. Pigments ground in the special japan vehicle are known as COACH or AUTOMOBILE COLORS. There is hardly any limit to the shades they can be had in, and some manufacturers list as high as twelve hundred.

Thinned down with turpentine and applied, they dry without gloss to a flat dull finish, and are usually referred to as FLAT COLOR COATS.

COLOR RUBBING VARNISH

Rubbing varnish is so named because it is made to dry with a hard resinous film that can be rubbed smooth with abrasives. It is not made to withstand exposure, and unless itself protected by the finishing varnish, soon goes to pieces. Rubbing varnishes are generally six to twelve gal. varnishes—that is, they contain that much linseed oil to each 100 lb.

of the hard, unmelted resins, and it is this preponderance of resins that causes it to dry with a film hard enough to withstand rubbing. The coats of rubbing varnish are rubbed with powdered pumice stone and water, in order to free them of any gloss or surface irregularities, and to give them the necessary finish for receiving the final coat of finishing varnish.

Most of these varnishes are dark in color, and hence tend to change the color of the surface over which they are applied. Whites are turned into creams, blacks and blues assume a greenish hue, grays appear as brownish yellow, etc. Therefore, in order to avoid this loss of color, the color or pigment is mixed with the rubbing varnish, and when thus applied the pigment is brought to the surface, and ITS COLOR displayed with less influence from the color of the varnish. When so mixed the material is known as COLOR RUBBING VARNISH. They are not opaque materials, and their use always necessitates a properly prepared ground work of color.

FINISHING VARNISH

This is the material that is used to protect and add the final decorative touch to all of the elaborate work built up with the surfacing and decorative materials. Just as its name implies it is the finishing coat, and properly applied the job is finished. It must do many things and do them well. It must serve as a protective film for all of the undercoats—be non-porous, so air and moisture cannot get beneath it, durable, hard and elastic, able to withstand all weather, changes of temperature, water, soap, grease, polish, dirt, dust, oil and gravel from the road, and it must also serve as a decorative material by giving to the job its high degree of luster and brilliance.

These varnishes are generally rated as about 25 gal. varnishes—that is, they contain that much linseed oil to each 100 lb. of the hard unmelted resins. It is the preponderance of oil that gives them their elasticity. Their resinous contents determine their gloss.

COLOR FINISHING VARNISH

Just as the color is added to the rubbing varnish and color rubbing varnish made, so may it be added to the finishing varnish, and color finishing varnish made. So mixed they are not ordinarily used for the best grade of work in automobile painting, except on running gear, but they are extensively used by the car owner who wishes to paint his own car—quite difficult for the novice, and not to be recommended.

Concerning Men You Know

C. C. Secrist, for nine years connected with the advertising department of the Universal Portland Cement Co., has been appointed sales manager of the Victor Manufacturing & Gasket Co.

A. D. Moore, formerly manager in Kansas City and Chicago for the branches of the Ohio Electric Car Co., and later general sales manager at the Toledo factory, has moved to Detroit to take over distribution of the Milburn Electric in the Detroit territory.

H. E. Westerdale, of the Westerdale Motor Sales Co., Cleveland, has taken over distribution rights in Michigan for the Gardner car, manufactured in St. Louis. Mr. Westerdale is a former Detroit automobile man and at one time was connected with Studebaker and later with the Hupp organization.

A. G. Schonmaker has been made treasurer and general manager of the Eastern Motor Sales Co., Detroit, distributors of Service trucks.

P. L. Emerson, widely known in the automobile industry, has joined the Reo Motor Car Co. sales organization at Lansing. Mr. Emerson was formerly sales manager of the Olds Motor Works and resigned that position several months ago to assume the vice-presidency of the Jackson Motor Corp.

W. O. Browne has been appointed general sales manager of the Southern Motor Manufacturing Association, Ltd., Houston, Texas. Previous to joining Southern Motors, Mr. Browne was district manager and special representative of the Bethlehem Motors Corp.

Alan R. Fernald, connected with the Willys-Overland organization in the sales and commercial car department, has been appointed advertising manager of the Chrysler Motor division of the Willys corporation, with headquarters at the general offices at Elizabeth, N. J.

R. P. Pennock, one of the oldest employees of the Leach Biltwell Motor Co., has been promoted manager of the sales department of the company.

A. G. Maney has been appointed director of distribution of the Franklin Automobile Co. He has been serving for some time as assistant to the president in connection with the merchandising end of the business over which he now has direct supervision.

Earle E. Devlin, assistant to the general sales manager of Hare's Motors, has been promoted to office sales manager, a position newly created. The purpose of this office is to have one man responsible for all sales and specifications taken care of at headquarters.

Benjamin L. Peer, for many years manager of Rochester's automobile shows, has become sales manager for E. J. Ellis & Co., Rochester, N. Y., distributors for the Dodge car.

C. F. Clow, branch manager at Cincinnati of the Sewell Cushion Wheel Co., has been appointed assistant sales manager of the company. He will be succeeded at Cincinnati by C. W. Frick, formerly of the Dayton, Ohio, branch.

C. B. Warner, former chief engineer, has been placed in charge of sales for the Nelson Motor Truck Co. at Saginaw. He will have A. W. Campbell as his assistant.

known local service man, has taken over the managership of the new service station. A full line of automotive parts will be carried. There has been a complete renovation of the interior of the building occupied by the salesrooms and station.

Harding Invited to Speak at December National Conference

Columbia, S. C., Nov. 12—Senator Warren G. Harding, president-elect of the United States, has been invited to deliver an address at the national automobile conference to be held in this city Dec. 9-10 in connection with the annual meeting of the South Carolina Automotive Trades Association. United States Senator N. B. Dial of this state has also wired Senator Harding urging him to accept the invitation. Senator Harding is to be in Virginia Dec. 6, and it is hoped that he will accept the invitation to come to Columbia.

David Jamison, president of the American Automobile Association, has also been invited to attend and speak on the subject: "What the Car Owner Expects of the Dealer." Harry B. Harper, president of the National Automobile Dealers' Association, has already accepted an invitation to attend the meeting, according to officials of the local association.

Sales of Maxwell and Chalmers Cars Showing Notable Increase

New York, Nov. 11—Time for the deposit of stock, unsecured notes and claims and for the exercise of purchase rights under the plan for reorganization of the Maxwell Motor Co. and the Chalmers Motor Corp. has been extended to Nov. 15. Stockholders who failed to exercise their purchase rights and make their initial deposit by Oct. 27 will be required, however, to pay a penalty of 25 cents for each \$100 of principal. Time for filing applications for the purchase of new stock in excess of the minimum rights has been extended, without penalty, to the close of business Dec. 1.

The reorganization committee headed by Walter P. Chrysler announces that more than 85 per cent of the outstanding notes and claims have already assented to the plan and that more than 80 per cent of the outstanding Maxwell and Chalmers stock has been deposited. Practically all of the bank creditors have subscribed to the plan as well as a large number of the merchandise creditors.

Substantial progress has been made by the reorganization committee in expanding and developing the selling organization. It is stated that more than 4000 automobiles have been sold since the middle of August. Prior to that date sales of Maxwell and Chalmers cars had been at a standstill for some time.

COUNTY TO OPEN GARAGE

Buffalo, Nov. 11—The Erie County board of supervisors is considering the establishment of a county garage to cut the cost of maintenance of public cars. An annual report showed upkeep on

twenty-six county cars amounted in one year to \$35,015. An estimate that a garage could be built for \$27,000 and maintained for \$3,000 was submitted. A favorable recommendation for construction was made by a special committee named to investigate.

duPont Motors Holds Sessions Incident to Moving of Plant

Wilmington, Del., Nov. 13—The duPont Motors Corp., which has its headquarters here, will reach its ultimate output of duPont cars for the present in a few days, this being five machines a day. On the occasion of the moving of the car construction plant to the new buildings at Moore, Pa., there was a two-day convention here. Those in attendance represented different concerns that are handling the duPont car. There were men here from Cleveland, Kansas City, New York, Atlanta, Boston and Los Angeles. They were entertained at dinner at the Hotel duPont on Wednesday and on Thursday visited the new works at Moore.

NEW STATION IN SPRINGFIELD

Springfield, Mass., Nov. 12—"Service with a smile" has been adopted by the Daniels-Hurley Motor Co., which has opened its new salesrooms and service station for Mitchell motor cars in this city. The territory allotted to the local concern includes the four western counties of Massachusetts, Windham, Bennington, Windsor and Rutland counties in Vermont and the northern part of Connecticut. R. C. Humphrey, a well-

DRIVEAWAYS WILL BE FEWER

Washington, Nov. 13—Reduced manufacturing schedules which have ensued during the readjustment period have enabled the railroads to move equipment for automobile loading to meet practically all demands. Traffic officials believe that carriers will be better situated to handle heavy winter shipments and thereby reduce the number of "drive-aways" which had been anticipated during the traffic congestion of the summer and early fall months.

Dodge Dealer Draws from Many Lines of Business for Staff

Boston, Nov. 11—President C. S. Henshaw of the Henshaw Motor Co., Dodge Brothers dealer, has recently added 18 men to his organization, drawing them from many other lines of business. The new members of the staff are F. S. Chandler, Corporation Trust Co.; H. A. Knowlton, Melrose Garage; P. R. Boomhower, Bethlehem Ship Building Corp., Ltd.; J. B. Buzzell, MacDow & Brown, public accountants; Ralph Sanborn, Automobile Mutual Liability Insurance Co.; J. A. Moran and T. J. Reynolds, H. J. Heinz Co.; R. W. Cutler, Bigelow & Dowse; H. A. Hoffman, William Read & Son Sporting Goods Co.; E. J. Daily, Stone & Webster; G. H. Wilson, Lehigh Portland Cement Co.; B. S. Jeffrey, Scripps-Booth Co.; P. A. Hunt, Dunn & Hunt Co.; R. D. Thomas, aeroplane industry; L. S. French, U. S. Department of Agriculture; R. C. Huddy, City of Boston; G. S. Barnes, Malden Gas & Electric Co., and F. W. Briggs, Massachusetts Chocolate Co.

A Department of BETTER BUSINESS



Conducted by Ray W. Sherman

What the Dealer Can Do *RIGHT NOW* To Get His Sales Going

A Dealer Steps Forward and Gives This Method

1 ST. Go over all your prospects and eliminate all those whom you know are uncertain financially: Those wage earners for instance whom you feel perhaps will lose their jobs whenever the time comes when the shirkers will have to start all over again, but in other fields and those who are not wage earners but by reason of reckless management of their affairs are pretty near the rocks in case the wind shifts. This will eliminate wasted effort and leave your full power with and for those who are established citizens and whose affairs are in a safe and sane state.

2nd. Have a distinct understanding with the factory for a guarantee against a decline in price up to next May or June, in case your machine is one on which there has been no drop in price recently. If your machine is one of those on which the price has been lowered then get a full detailed report from them on the factory state of affairs, applying to all parts; the purpose being to get as nearly as possible all data bearing on the future possibilities of output and price.

3rd. Go to your select prospects, present all this data to them in a thorough businesslike way: In short get their attention by your sincerity; get them interested in all the facts you have taken the trouble to acquire and then create a desire by bringing to their minds the advantages of their owning the machine now and having use of it rather than waiting without any material plan.

4th. Close the sale at the first opportune moment; let being on the job be the watchword and always remembering that many a man has determined today not to buy a machine but will buy one tomorrow. All this will require system, sincerity, salesmanship, WORK, but I believe it is the only way. What I would not spend any time and money on NOW is a big hurrah, splash and noise.—W. R. Reinhardt, Spokane, Wash.

\$1 For an Idea

What in your mind is the most helpful thing a dealer can do right now to get his sales going?

Give us those ideas. Let's get business started again! We can if we think we can! Motor car men are the liveliest type there is! Let's start!

And let's have some "starting ideas." For the trouble of writing the idea MOTOR AGE will pay one dollar.

Send 'em in!

Eliminating Small Adjustment Expenses

Giving a series of free public lectures for the education of the motorist in regard to the care of his car, is one method the Triangle Electric Co., Seattle, uses to stimulate winter business. These lectures are intended to discourage the motorist from bringing to the automobile repair shop small jobs requiring no mechanical skill, and which the owner with a proper knowledge could do just as well himself. Among the subjects listed for this season are "Ignition," "Ignition Equipment," "The Storage Battery," "The Charging System," and "The Starting System." In the publicity preceding the lectures, the name "The Triangle Electric Co." is brought prominently before the Seattle motoring public. At the lectures themselves, however,

there is no advertising propaganda to destroy the effectiveness of the meetings. It is the belief of this concern that whatever is done to bring the motorist to a closer understanding of the make-up of his car helps the automotive business in general. They have found that the business and publicity traceable to these lectures more than pays for the expense incurred in holding them.

These meetings tend to impress the public with the sincere desire of the Triangle company to help them and incidentally confidence in the class of work done by this concern is instilled in their minds and when a big job is to be done on their cars, they know where to go. Making business by discouraging business as practiced by this service station is proving a paying proposition.

Meeting the Customer

I always make it a point to have some one in the front office to take care of customers as they come in. I find this is quite an aid to business, as a customer, especially if he is a stranger, does not like to wander around the garage or repair shop looking for some one. It is the same in a garage or repair shop as in any retail business. When a customer comes in he desires to be waited on promptly and dislikes to look around for some one to attend his wants. By following this plan I have increased my business to a large extent."

Nationally Advertised Goods Sell Best

Have you ever stopped to think what money is? Of course, you have. It is only metal with the Government stamp upon it. Surely all metals have their value, but you can not spend them. They are not means of exchange.

Take a piece of silver the weight of a dime and see what you can get for it. Then take the same piece to the mint, have it rounded out, and the Government stamp put upon it. What a difference.

It is worth ten cents the world over. You can trade the plain silver, but you can not get ten pennies for it. What makes the dime worth ten cents? Only the knowledge the people have of the Government behind it.

Now it is just about the same with the package of merchandise that is made of a standard value as a result of advertising. In the first place, ninety-nine times out of one hundred, the goods themselves are of superior quality. No man is foolish enough to spend big money to advertise inferior goods.

The next thing is to secure a trade mark that will be appropriate. Then place an advertisement that will impress upon the mind of the public this trade mark and what there is behind it. It is this advertising that does for the domestic commodity what the Government does for silver.

Think of it in this way. Do you believe that the stamp of the Government upon silver makes it less valuable? By exactly the same line of reasoning, you can figure out how it is impossible for advertising to lessen the value of merchandise.

Quite to the contrary. The more intensive the advertising, the greater value there is likely to be in the merchandise. —Business Chat.

When He Says Our Shop Prices Are High

I answer that it may seem that way to him, but we hire only good mechanics and pay them a living wage, and according to the class of work we do and the guarantee we give and stand back of, our charges are as reasonable as he will find anywhere.

If at a Ford Agency or dealer I show him our contract price list and explain to him that all our work is done on that basis and, therefore, we can not overcharge him.—L. L. Butterfield, Tri-State Motor Co., El Paso, Texas.

When a Customer Says All Our Prices Are Exorbitant

I tell him that I don't know why he feels that way, but as for our concern, it has been established for years and has hundreds of satisfied customers all over the state. If we were robbers or thieves we could never do the amount of business we do. I tell him probably he has had some work done at an unreliable place, and had been charged a first class price for it.

I tell him that if he is willing to give us a trial, he will find that we do first class work and will not hold him up, either.—L. L. Butterfield, Tri-State Motor Co., El Paso, Texas.

When He Says the Old Car Is Good Enough

I agree with him that the old car may be satisfactory at the present time, but tell him that after a car has given a cer-

tain amount of mileage and has had a certain amount of use, the depreciation is getting lower, and the repair bills are coming oftener and higher. And, after all the work he is having done, he has still got an old car.

In buying a new car he will save the time and money that he formerly lost in having his old car laid up for repairs, either outright or by turning it in.

And last but not least, I tell him of the pleasure he will feel in driving a nice new car.—L. L. Butterfield, Tri-State Motor Co., El Paso, Texas.

You'll Be Surprised

The BIG CHIEF says

*IT CAN BE DONE!
Your Business can be made
an all-the-year-round
business if you will sell your-
self the "BIG IDEA" and
STICK to it—Make an honest
effort to sell one WINTER
necessity to each of the
next TEN motorists who call.
You will be surprised at the
results—“Only Five Fish
can swim up stream” also.
Only going cars can keep busi-
ness coming—Buy and sell
Winter conveniences and
necessities. H. M. D.*

The Pepper Pot

Here are a few borrowed from The Pepper Pot, the organ of the Pressure Proof Piston Ring Co., of Boston:

Sell yourself your job every morning when you get out of bed. If you don't love your work enough to be glad to go to it, get rid of your job.

Competition is a good thing; it makes us just a little more polite than we would be if we had things all our own way.

There are two kinds of discontent in this world—the discontent that works and the discontent that wrings its hands. The first gets what it wants, and the second loses what it has. There's no cure for the first but success; there's no cure at all for the second.

A Battery Code

There is nothing like being prepared for customers when they are in the mood to argue. Floyd C. Standish, Hartford, Conn., U. S. L. battery sales and service representative, makes good use of a three initial code for marking batteries. The code is changed monthly. For instance the October marking was T. T. N. Now when a customer comes in six months later and claims that his battery

was overhauled two or three months before, Standish has only to note the marking stamped on the terminal to know definitely just when the battery was overhauled. The code has been found very effective.

A Good Executive Highly Important

The selecting of a good executive to be head of the service department is one of the changes that has been made in the business of the Belt-Franklin Co., of Columbus, for the purpose of increasing efficiency. The company finds that a foreman or superintendent of the service department must be a man who knows how to handle men in order to obtain the best results. To that end a good executive was selected and results have proved the wisdom of the change. The work is done more promptly and in better shape than formerly and there is less friction among the employees.

Let's Try It

If I were asked what should be the sixth sense, and most valuable of all to the general welfare of mankind, I believe I would answer—smiling.—Business Chat.

Putting the Service Idea Across

The Britton Co., Hartford, Conn., Federal truck representative, makes good use of a small show window to get a service message across. The window is filled with numerous parts of the Federal very neatly arranged. And where all may see, the words “This means service” are spelled out with steel bushings and brass rivets. The company has always been strong for truck service and never neglects an opportunity to impress upon prospective buyers its ability to give service.

Not His Job

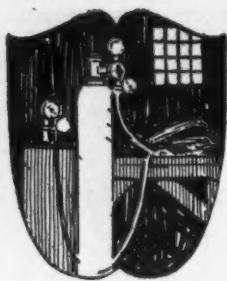
“I'm not supposed to do that,” said he,
When an extra task he chanced to see;
“That's not my job, and it's not my care,
So I'll pass it by and leave it there.”
And the boss who gave him his weekly pay
Lost more than his wages on him that day.

“I'm not supposed to do that,” he said;
“That duty belongs to Jim or Fred.”
So a little task that was in his way
That he could have handled without delay
Was left unfinished; the way was paved
For a heavy loss that he could have saved.

And time went on and he kept his place
But he never altered his easy pace,
And folks remarked on how well he knew
The line of the task he was hired to do;
For never once was he known to turn
His hand to things not his concern.

But there in his foolish rut he stayed
And for all he did he was fairly paid
But never was worth a dollar more
He got for his toil when the week was o'er;
He knew too well when his work was through
And he'd done all he was hired to do.

If you want to grow in this world, young man,
You must do every day all the work you can;
If you find a task, though it's not your bit,
And it should be done, take care of it!
And you'll never conquer or rise if you
Do only the things you're supposed to do.
—Edgar A. Guest.



Autogenous Welding

What it is and how it is applied



THIS is the eighteenth of a series of articles on autogenous welding. These articles are intended to be of aid to the man who must learn the art of welding with little or no personal instruction. They are also intended as a reference for the man attending a welding school. It is likely that during the first few months of his instruction many problems will come up that may be solved more readily with these articles on hand.

Finally, this service should be of benefit to any automotive service man or repairman, even though he never intends to have a welding torch in the

shop. The reading of these articles will give him an understanding of the subject which should greatly aid him in general repair work. He will be better able to decide, when he has a part to repair, whether it is feasible or not to weld it, and if so, if it will pay. The more familiar one becomes with this art, the wider the scope of its application. The man who is versed in the art will find many clever applications that one who is less familiar with the subject would never dream of. An understanding of welding principles offers a new technique to the repair man.

Part XVIII—Welding Cast Iron

CAST iron is one of the easiest metals to weld but there are several points which must be borne in mind if a soft weld is to be obtained. Pre-heating the piece to be welded and allowing it to cool off slowly after the job is finished are two very important points.

When the metal is heated to a cherry red, welding may proceed.

The main reason that cast iron welds are often too hard is that the metal is more or less oxidized. By playing the flame too long on one spot the silicon is burned out. Some silicon is burned out in any event but this is replaced by the silicon in the welding rod.

When welding cast iron it is good practice to keep the cone of the welding flame away from the work, never allowing it to touch. The tip of the flame should be from $\frac{1}{8}$ to $\frac{1}{4}$ in. away from the metal. This method minimizes oxidation and at the same time permits the heat to permeate the metal.

Cast Iron Hard and Brittle

When the weld is about completed the torch should be adjusted to give a slight excess of acetylene to produce a soft weld, free from blowholes.

Cast iron is hard and brittle. It cannot be rolled but is excellent for casting. There are two kinds of cast iron, grey and white, with an intermediate stage known as mottled. In grey iron the carbon occurs as graphite while in white iron it is combined with the iron. White iron is hard and very brittle while grey iron is softer and tougher. The former is obtained by quick cooling and the latter by slow cooling, a fact which should be remembered in treating cast iron after the weld is made. Except in

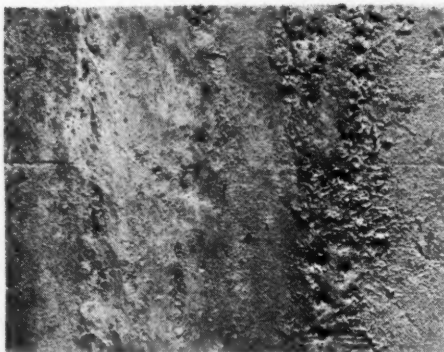


Fig. 69—A good cast iron weld

rare cases where hardness is desired the aim of the welder is to produce grey iron.

All cast iron work should be pre-heated to some extent. The most important factor in the success of welds on large castings is the proper treatment by pre-heating. The pre-heating problem should be given careful study. There are far more failures in the welding of this metal from haphazard methods of relieving expansion and contraction than from any other cause.

When cast iron is in fusion it oxidizes very rapidly, the oxide beginning to form at a bright red heat. The oxide melts at a temperature of 2400 to 2450 deg. which is 300 to 400 deg. higher than the melting point of the metal. In order to break the oxide down and allow the metal to flow together a flux must be used. A properly formulated flux will dissolve the oxide and float it to the surface so that it may be removed by scraping the molten surface with the end of the welding rod. The slag thus obtained should

be tapped off the end of the rod before it is put back in the weld.

Cast iron is quite fluid when melted and consequently offers difficulty where vertical or overhead welding is attempted. Its fluidity also causes it to entrap gases, dirt and oxide.

There is a certain amount of silicon in cast iron, its function being to act as a softener. The intense heat of the blowpipe will volatilize this material to a certain extent tending to leave the weld too hard. To compensate for this loss a welding rod which contains from 2.75 to 3.5 per cent silicon should be used.

The flame should be applied to the weld at such an angle that the metal will not be blown ahead. Inasmuch as the metal is quite fluid when molten, the welding is carried on in a series of overlapping pools or puddles. The welding rod is applied by placing it in these pools and playing the blowpipe around it. Continual "working" of the rod is necessary to prevent blowholes and force out dirt, scale, etc.

Working Over Not Advisable

The central jet of the flame should never touch the molten metal but should be held from $\frac{1}{8}$ to $\frac{3}{16}$ in. away from it. Occasionally it is necessary to remove a blowhole in which case the hole is burnt out with the flame and then the metal is worked over with the welding rod. The working over of a weld should be avoided unless it is absolutely necessary.

When the weld is finished and is still hot the accumulation of scale, dirt, and flux on the surface should be removed by scraping with a coarse file since this coating is very hard and difficult to remove after the metal cools.

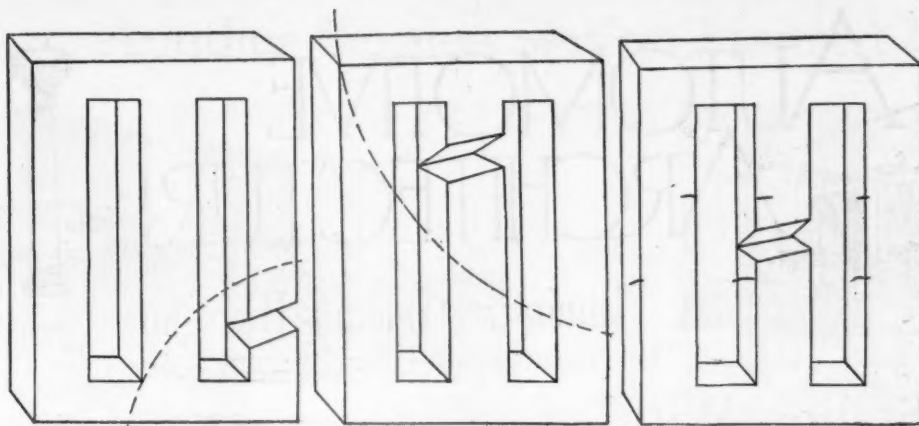


Fig. 70—A, B and C. The preheating necessary in the case of welding each break is described on this page

WELDING CAST IRON

Let us consider the welding of two $\frac{3}{4}$ in. cast iron plates beveled at 45 deg.

Cast iron is always welded with a flux but in order to demonstrate the necessity for a flux it is advisable to do the first job without one.

Cast iron is extremely fluid when molten and, therefore, cannot be welded in layers like steel; it must be welded in a series of puddles.

The blowpipe should be held at a 60 deg. angle. After the metal has commenced to melt, the rod should be placed in the molten puddle and the blowpipe swung from one side of the V to the other. The welding rod should be held in this molten metal and worked in by rubbing the rod against the sides of the V, this action working out to the surface any sand or impurities that may be in the metal.

When the weld is finished it will be noted that the surface is covered with a coating which is difficult to remove.

Remove White Spots

A similar weld should now be started but in this case flux should be used. The application is made by dipping the hot welding rod into the flux a small quantity of which will stick to the rod. When the rod is inserted into the weld this will melt off. The flux should be added to the weld whenever scale, sand or dirt appear.

The rod is kept in motion by rubbing it along the sides of the weld and the weld gradually completed by making a continuous series of little puddles. Sand, scale and blowholes should be worked out of the metal by means of flux and the motion of the rod.

Whenever a white spot appears in the melted metal it is either scale or sand or some other impurity. If it is allowed to remain it will form a blowhole. Such a white spot should be removed by the welding rod.

Cast iron welding should be carried on continuously as fast as possible until the job is completed. If it is absolutely necessary to go back over the weld, metal from the filling rod should be added.

If a good cast iron welding rod is used it will help make the weld soft.

All cast iron welds will be hard if they are not cooled slowly.

Just after the weld is finished and it is still at a bright red heat, scrape off the surface to remove the flux, scale and dirt that have been worked out of the metal. If this is not done the weld will have a very hard surface notwithstanding the fact that it will be soft underneath. This scraping can be done with a chisel, the blunt end of a file or a piece of flat scrap iron.

Fig. 70 shows cast iron frames with

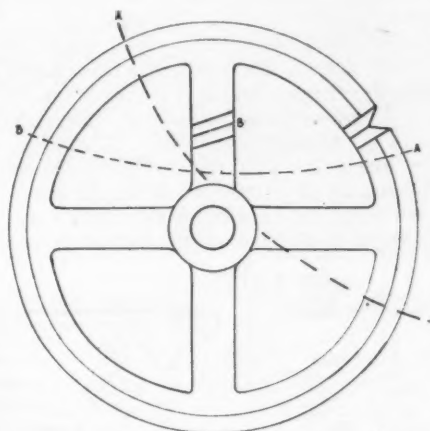


Fig. 71—The dotted lines shows the preheating necessary for this pulley with breaks at A or B

breaks. The effect of expansion and contraction will be given special consideration in each case.

If A were welded cold there is a chance that the contraction of the metal on cooling would cause another breakage at this point. To prevent this a corner of the piece is placed in a charcoal fire and heated to a dark-red heat. When it is finished it is carefully covered and allowed to cool slowly.

In the case of fracture B a larger area must be heated.

To prevent fracture of C after it has once been welded contraction may be prevented by heating a strip right across the casting as indicated by the dotted lines.

A pulley is shown, Fig. 71, with two cracks, in a spoke and in the rim. The actual welding is simple; each crack should be beveled out and treated as previously described.

The spoke and adjacent parts of the pulley should be pre-heated as indicated by the dotted line. It is ready to weld when it has reached a dull red heat. It will be noted that the pre-heating covers a spoke on each side of the broken one. This should be done when the spoke is broken. After welding it should be cooled in the pre-heating fire and protected from drafts by means of asbestos paper.

If both cracks appear in the same pulley the one in the spoke should be welded first and the one in the rim should not be attempted until the first job is perfectly cool. The pre-heating fire as indicated by the dotted line should include a segment of the rim and the other ends of two spokes.

FORM USED CAR CLEARING HOUSE

Hartford, Conn., Nov. 9.—Aaron Cohen, formerly of the firm of the Oldsmobile Co. of Hartford, who recently resigned to go into business for himself, has established a used car clearing house here. He has arranged with various Hartford dealers to handle their used cars on commission and in addition conducts a repair and service department. He advertises to select any make of used car for a prospective buyer. The venture is being watched with interest as the clearing house idea should be of help to dealers in moving their stock of used cars.

AKRON SHOW IN DECEMBER

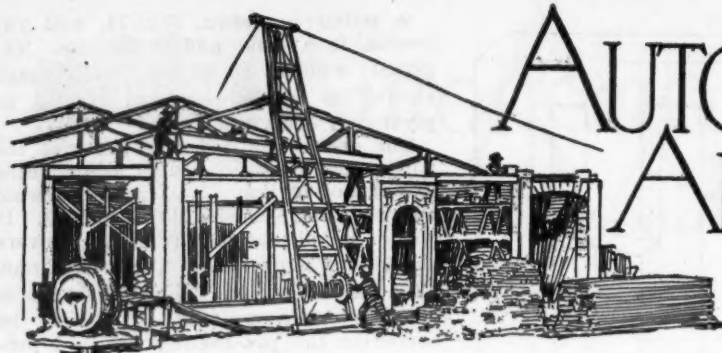
Akron, Ohio, Nov. 6.—Akron's 1921 automobile show will open in the immense Central garage here Dec. 25 to Jan. 2 and will be held under the auspices of the Akron Auto Exhibition Co., E. T. Jones, general manager. The space allotted for the exhibit contains 34,000 sq. ft., and it is feared this will not suffice. The exhibitors predict that this will be the biggest 1921 show in northeastern Ohio.

MCDONALD JOINS TIMES SQUARE

New York, Nov. 1.—O. R. McDonald, for several years active in automotive equipment trade and association circles, has joined the Times Square Automobile Supply Co. as second vice-president and general manager. He was for a number of years sales manager of the equipment division of the Herring Motor Co., Des Moines, leaving there to become equipment sales manager for the Gibson Co., Indianapolis, which position he resigned to accept his new connection.

OPEN NEW SERVICE STATION

San Francisco, Nov. 11.—J. W. Leavitt & Co., Oldsmobile distributors for the state, are opening a new service station here. It will handle Oldsmobile Economy truck service only. When the building is completed it will be one of the most modern truck plants in the West. A truck salesroom will be a feature.



AUTOMOTIVE ARCHITECTURE

Planning and Building Problems

CONDUCTED BY TOM WILDER



Small Service Station With Night Storage

No. 285

SMALL SERVICE STATION WITH NIGHT STORAGE

Please give suggestions as to the best layout for the floor plan of a small service station for general repairs. Equipment will consist of bench, four vises, electric emery wheel, weaver press, forge and anvil, overhead track with trolley and chain blocks to washing tank, air compressor and motor stand. Will employ six workmen, operate a wash stand and figure on storing six to ten commercial cars which will be out first thing in the morning and not return until night. I want to get the work in and out with as little delay as possible.—C. B. Crook, Little Rock, Ark.

The first and most important thing to consider is the removal of the row of posts through the center of the room. These posts are placed in the most inconvenient place for the handling of cars and should be removed altogether and the roof-trussed or at least arranged as in our layout to leave the aisle clear. The latter arrangement is the cheaper of the two.

In this department MOTOR AGE aims to assist its readers in their problems of planning, building and equipping service stations, garages, dealers' establishments, shops, filling stations, and in fact any building necessary to automotive activity.

When making requests for assistance please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

And how much of an accessory department is anticipated.

If you store ten cars at night they will require two-thirds of your floor space and your problem will be to take care of the cars on which you are working at these times.

If you are working on four cars they may be pushed into the positions A, B, C, and D, provided they are in a condition to be moved. Even here, if they are large cars, they will cut down the aisle so much that it would be difficult to get large commercial cars in and out.

Inasmuch as your main purpose is to get work in and out with little delay, it appears to us that storage will put a serious handicap on your activities. You might reserve the northeast side for cars being worked on, leaving space for storage of cars on the south end and store probably three more cars in the aisle. If you stored more than this, the aisle would be blocked.

It would be best not to partition off the shop in this case, as it would make it too small to hold more than two cars, as shown at E. The small diagram gives

another layout which would require a new entrance, but would not call for changing the posts. It might be preferred to the large one and is, undoubtedly, better in some respects.

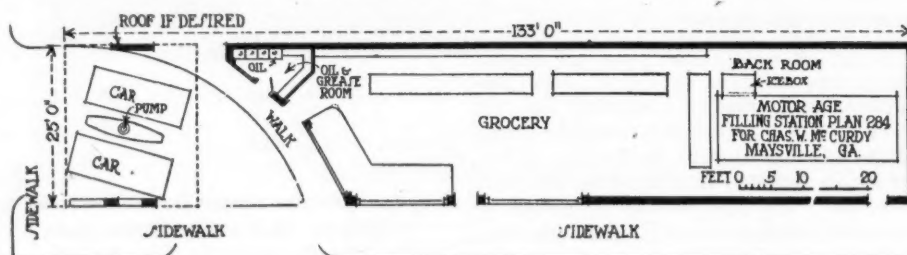
No. 284

GROCERY WITH FILLING STATION

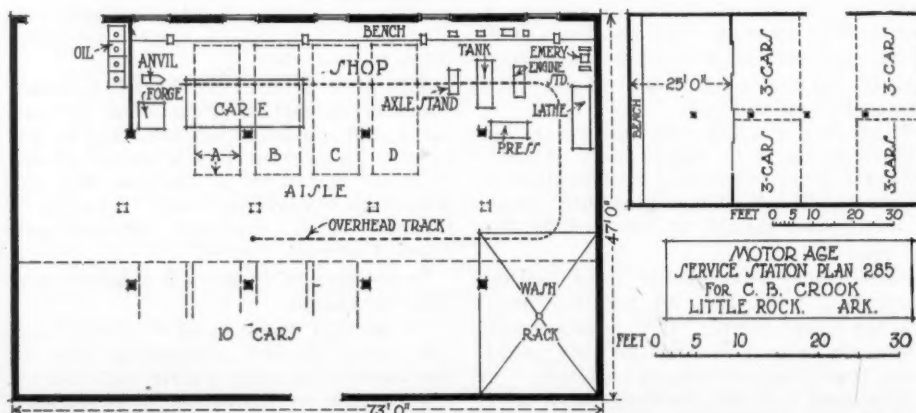
I have a corner lot 25 by 133 ft. on which I am planning to erect a filling station and fancy-grocery store. My idea is to have a triangular building, but I cannot decide on the style of roof, or whether or not to have an awning over the entire open court. Kindly make suggestion.—C. W. McCurdy, Maysville, Ga.

We know very little about the fancy-grocery business but suggest you separate it more or less from the gasoline and oil business. It is always hard to use to the best advantage a triangular building, such as you show in the sketch; nothing fits in it, and there is too much wall space and too little floor space.

If the streets are not congested, the simplest proposition would be curb pumps, as they do not take space from the lot; if there is too much traffic, or other reasons for not using the curb pumps, we recommend something along the lines of our layout.



No. 284—Grocery with filling station



No. 285—Small service station with night storage

Another Service Station Planned by Motor Age



Above: A corner of the accessory department and a view of the machine shop in the service station of the Franke Motor Co., Mullen, Nebr.

FRANKE MOTOR COMPANY Mullen, Nebr.

Motor Age,
Chicago.

We are mailing you a few pictures of our new service station although it is not entirely completed.

We have a \$15,000 stock of accessories, are distributors for Buick cars, G. M. C. trucks, Vest batteries and various makes of tires. We operate a battery repair department, although we do not repair tires. We use the flat rate system. We hope to have some better pictures taken soon and will be glad to send you some of those.

Yours very truly,
FRANKE MOTOR CO.



Exterior view of the sales and service station designed by Motor Age for the Franke Motor Co., Muller, Nebr., in accordance with their specifications

Above is a copy of a letter of appreciation of the garage planning service we extend to our readers. We should be pleased to know your building requirements and prescribe an efficient layout

Illinois Association Acts to Increase Membership in State

Galesburg, Ill., Nov. 12—The third meeting of the Board of Directors of the Illinois Automotive Trade Association has been held here at the Hotel Custer. A quorum of seven members from various parts of the state attended. Matters of great importance to the trade were discussed and a constructive policy tending to the improvement of the service of the association was outlined.

The first issue of the Illinois Automotive Trade Magazine, official organ of the association, was approved by the board, and F. C. Zillman, the secretary and manager, was instructed to increase its circulation to approximately 5,500 copies monthly so that every firm in Illinois engaged in the automotive business might regularly receive a copy. It was thought that by this plan the association purpose could be brought to the attention of the entire trade of this state, with a view to increasing the membership. The next

meeting of the board will be held in Peoria in January, the exact date to be determined later. At that time a definite legislative program will be formulated.

ALUMINUM PISTONS

Credit for the views expressed in the article appearing in *MOTOR AGE* of Oct. 21 under the caption "Aluminum Pistons" was inadvertently omitted at the time of publication. The article should have been included under "Manufacturers' Communications" as having been received from the American Hammered Piston Ring Co.

FISK TIRE CUTS PRICES

New York.—Reductions closely approximating those of the United States Rubber Co. are announced by the Fisk Tire & Rubber Co. They range from 10 per cent to 12½ per cent on fabrics with a smaller cut on cords. The detailed price lists have not been prepared.

Measure Providing Greater License Fees Has Opposition

Trenton, N. J., Nov. 12—More than two hundred representatives of automobile and manufacturing organizations attended a hearing by the Assembly Judiciary Committee and objected to the White bill providing for increases in automobile license fees. A joint committee of opponents of the bill, among them the Association of Automobile Clubs of New Jersey, the Newark Automobile Trades' Association, the Union County Mill Owners' Association and the Truck Club, submitted a statement in which it was charged that, under the bill, the fees would be increased from 3 to 95 per cent on automobiles and from 25 to 362 per cent on trucks.

Backers of the measure had stated that the bill called for increases of "20 per cent and upwards. The chief argument of the advocates of the bill was that the state's immediate problem was to get more money for highway maintenance.

The Readers' Clearing House

Questions and Answers

Stromberg and Schebler Carbureter Adjustments

PUBLISH the cut of a Stromberg on a model 80 Overland, showing both adjustments clearly.—Roy F. Himelich, Frederic, Iowa.

The Overland model 80 was never equipped with a Stromberg carbureter as far as we are able to find out. According to our records a Schebler carbureter was used. The adjustment of the Schebler model R is as follows:

Refer to Fig. 1.

The Schebler Model R is an air valve type. The main or low speed adjustment on this carbureter controls the flow of the fuel through the low speed orifice. The other adjustment is essentially a high speed adjustment which controls the tension of the air valve spring. Fig. 1. This carbureter has an eccentric which acts on the needle valve and is operated from the dash and which insures easy starting, as by raising the dash adjustment the needle is raised from the seat and the air valve is locked, closed, thus insuring an extremely rich mixture for starting and heating up the engine. See that the lever B is attached to the dash control G so that when the boss D of the lever B is against the stop C the plunger on the dash control is clear in. This is the proper running condition for the lever B.

To adjust the carbureter, turn the air valve cap A clockwise until it stops, then turn to the left, or anti-clockwise one complete turn. To start the engine, open the throttle about one-eighth or one-quarter way. When the engine is started, let it run until the engine is warm, then close the throttle and turn air valve cap "A" to left or anti-clockwise until the engine hits perfectly. Advance spark three-quarters way on quadrant. If

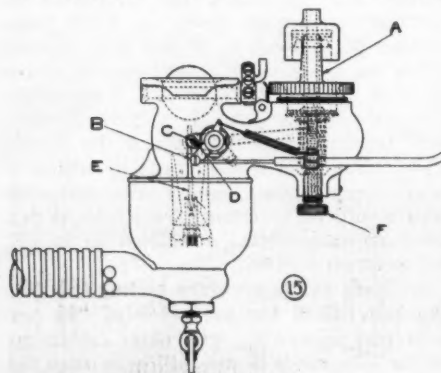


Fig. 1—Schebler carbureter adjustment

CONDUCTED BY ROY E. BERG

Technical Editor, Motor Age.

THIS department is conducted to assist Dealers, Service Stations, Garagemen and their Mechanics in the solution of their repair and service problems.

In addressing this department readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been asked by some one else and these are answered by reference to previous issues. MOTOR AGE reserves the right to answer the query by personal letter or through these columns.

engine backfires on quick acceleration, turn adjusting screw F up (which increases tension on air valve spring) until acceleration is satisfactory.

Turning the air valve cap A to the right or clockwise lifts the needle E out of the nozzle and enriches the mixture; turning to the left or anti-clockwise lowers the needle into the nozzle and makes the mixture lean.

Before starting, pull out the plunger G which lifts the needle E out of the gasoline nozzle and makes the mixture rich for starting and also locks the air valve. As the engine warms up, push the plunger in to obtain best running conditions, until the engine has reached normal temperature. When this temperature is reached, the plunger should be in.

For the best economy and power, it is recommended that the low-speed adjustment be made as lean as possible. However, if you have a Stromberg carbureter, an account of the Stromberg model L showing adjustments will help you. See Fig. 2. It has three adjustments, the high speed, the extremely low speed or idle, and the economizer.

The high speed is controlled by the knurled nut A which locates the position of the needle E past whose point is taken all the gasoline at all speeds. Turning nut A to the right (clockwise) raises the needle E and gives more gasoline; to the left, or anti-clockwise, less. If an entirely new adjustment is necessary: Put economizer L in the fifth notch (or farthest from float chamber) as an indicator. Turn nut to left, anti-clockwise,

till needle E reaches its seat, as shown by nut A not moving when throttle is opened and closed. When needle E is in its seat it can be felt to stick slightly when nut A is lifted with the fingers.

Find adjustment of A where it just begins to move with the throttle opening, then give 24 notches to the right or clockwise (the notches can be felt). Move the economizer pointer L back to O notch (toward the float chamber). This will give a rich adjustment. After starting and warming up the engine, thin out the mixture by turning A anti-clockwise, and find the point where the engine responds best to quick opening of the throttle, and shows the best power.

The gasoline for low speed is taken in above the throttle through a jet at K, and is regulated by dilution with air as controlled by the low speed adjusting screw B. Screwing B in clockwise, gives more gasoline; outward, less. The best adjustment is usually one-half to three turns outward from a seating position. Note that this is only an idling adjustment and does not affect the mixture above 8 m. p. h. When engine is idling properly there should be a steady hiss in the carbureter. If there is a weak cylinder or a manifold leak, or if the idle adjustment is very much too rich, the hiss will be unsteady.

The economizer device operates to thin out the mixture, by lowering the high speed needle E and nut A a slight but definitely regulated amount at throttle position corresponding to speeds from 5 to 40 m. p. h. The amount of drop and consequent leaning is regulated by the pointer L.

After making the high speed adjust-

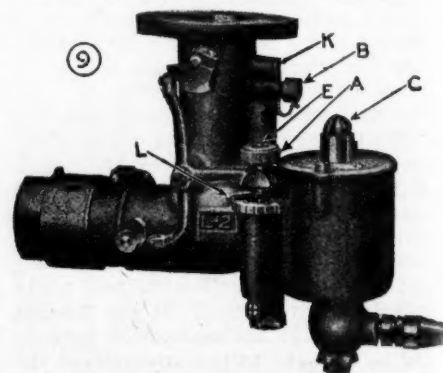


Fig. 2—Stromberg carbureter adjustment

ment for best power, with pointer L in 0 notch, as above described, place throttle lever on steering wheel to a position giving about 20 m. p. h. road speed. Then move pointer L clockwise (away from float chamber), one notch at a time until the engine begins to slow down, then come back one notch.

The amount of economizer action needed depends upon the grade of gasoline and upon the temperature.

In the Mid-West the best economizer adjustment will usually be the third or fourth notch; with Pennsylvania gasoline and in the South, the second notch, while on the Pacific Coast no economizer action is necessary unless Distillate (which should not be below 50 deg. Baume) is used. Also fewer notches economizer action will be necessary in summer than in winter.

For starting and warming up with the present day fuel, it is absolutely necessary to use the dash or steering post control until proper operating temperature is attained. Ordinarily the engine will start rapidly with the control closed one-half to three-quarters of the way. In very cold weather it may be necessary to pull the control up all the way, but this should be done only for an instant, as this cuts off all the air and delivers raw gasoline only. In starting, the throttle should be nearly closed, or it may be opened and closed while the starter turns the engine over. Never keep the control fully up more than a moment at a time.

After starting the control should be drawn up as necessary and, allowing the engine a moment to steady itself, should be set at the point of best power, yet not too rich for smooth running; it should then be gradually lowered. While the engine is cold, care should be taken not to open the throttle so far that engine misfires, as this is a frequent cause of sooted spark plugs and gasoline (kerosene) in the crankcase.

PACKARD FUELIZER

Q—Explain the Packard fuelizer.

2—Give instructions for adjusting the carburetor.

3—Explain the ignition system and give the timing.—W. J. Young, Rosedale, Kans.

1—An explanation and description of the Packard fuelizer was published in the October 7 issue of MOTOR AGE.

2—A cross sectional view of the carburetor used on the Packard car is shown in Fig. 3. The carburetor is of the automatic float feed type with a single spray nozzle and a cylindrical mixing chamber. The mixing chamber is a cylindrical chamber in which the gasoline atomizes and mixes with the air before being drawn into the cylinders. The gasoline after leaving the float chamber enters the spray nozzle which is located in the center of the mixing chamber.

The suction created by the pistons causes air to enter the mixing chamber through both primary and auxiliary air inlets and in passing around the spray nozzle draws gasoline from it, atomizing and mixing the gasoline with the air. The primary air intake elbow is at the front end of the carburetor. The elbow contains a shutter which is normally

Where You Will Find the Answer

To assist readers in obtaining as a unit all information on a certain subject, MOTOR AGE segregates inquiries in this department into divisions of allied nature. Questions pertaining to engines are answered under that head and so on.

Carburetion

Roy F. Himelich.....Frederic, Iowa
W. J. Young.....Rosedale, Kans.
Wm. Sticht.....Jersey City, N. J.

Electrical System

A. B. Hallock.....
.....Square Deal Garage, Peotone, Ill.
W. E. Steel.....Hartford, Mich.
J. Shelby.....Memphis, Tenn.
E. Christensen.....Tacoma, Wash.
Dr. F. J. Harris.....Providence, R. I.
Charles F. Weitzel.....Pleasant Hill, Mo.

Miscellaneous

Leslie Cramer.....Edenton, Ohio
Earl V. Zacher.....Mulvane, Kans.
S. W. Moebius.....Frisco, Utah
Oscar A. Olsen.....
.....Milton Garage, Milton, Minn.
J. K. Araki.....Hilo, Hawaii
A. E. Scott.....Albia, Iowa

Engines

C. B.
Dr. Geo. W. Norris.....
Grimes Auto Co.....Newark, Ark.
Frank Cais.....
.....1770 Hanover St., Aurora, Colo.
Walter Madin.....Moline, Ill.

open and not in use when running. This shutter is operated by the carburetor control on the dash, which also operates the auxiliary air valve.

By pulling the control all the way out

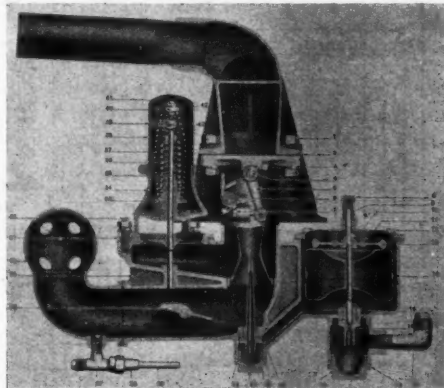


Fig. 3—Sectional view of Packard carburetor

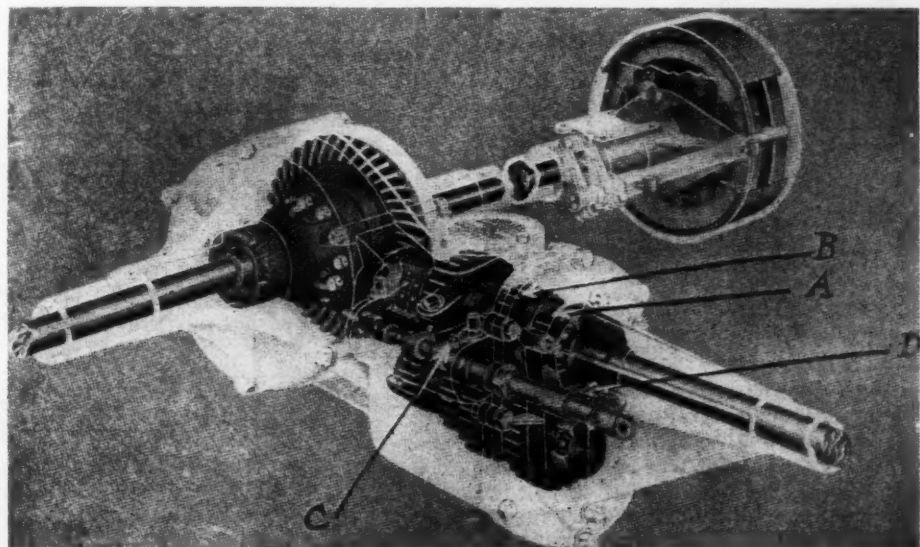


Fig. 4—Stutz rear axle and gear set

the primary air intake is completely closed, allowing a very rich mixture to be drawn into the cylinders. The control should be pushed in at least part way as soon as the engine starts to fire. The auxiliary air valve is in a housing forward of the mixing chamber and is controlled by the tension of two springs, one of which is within the other. At low engine speed most of the air is admitted through the primary air intake around the spray nozzle.

To prevent too rich a mixture at a greater throttle opening, the auxiliary air valve is opened by the increase in vacuum, admitting the right proportion of air to meet all conditions. Changing the tension of the springs will affect the amount of air passing through the auxiliary air valve. Adjustments of the auxiliary air valve are accomplished in this manner. These springs which control the action of the valve are adjusted by means of the cams placed beneath them and operated by the air valve control on the instrument board. The throttle valve is of the butterfly type and is located in the mixing chamber above the spray nozzle. It is controlled by the hand lever on the steering wheel and by the accelerator pedal.

3—A detailed description of the ignition system together with the ignition timing was published in the October 21 issue of MOTOR AGE.

STUTZ AXLE ADJUSTMENT

Q—Give the adjustments of the pinion and ring gear of the Stutz.—Wm. Sticht, Jersey City, N. J.

Fig. 4 shows a phantom view of the Stutz rear axle and gear set. It will be noted that there is a notched collar on each side of the ring gear carrier. This affords an easy adjustment of the ring gear. By loosening the small retaining lugs that hold the adjusting collar, it is possible to turn this collar either toward or away from the ring gear. To move the ring gear closer into the pinion, the collar on the right side should be backed off a few notches and the collar on the left side turned up the same number of notches. A play of 0.006 to 0.008 in. is the recommended clearance between the gears.

THE ELECTRICAL SYSTEM

ELECTRICAL SOUNDING TOOL

Is there any way of making an electrical sounding tool using telephone apparatus?—A. B. Hallock, Square Deal Garage, Peotone, Ill.

A device of this kind can be made from an old telephone receiver and a small tester which you can easily make yourself. The details of the tester are shown in Fig. 8. The principle of operation is similar to that employed in the telephone transmitter, where the intermittent vibration causes varying contacts to be made by carbon particles and these interrupt the flow of current from a dry battery to the telephone receiver.

The tester is easily made by turning up on a lathe a small piece of fibre about 2 in. in diameter and about $\frac{1}{2}$ in. thick having one side hollowed out.

A polished metal disk is secured to the fibre cup so as to provide a container for the carbon particles when the disk is in place. The inside of the cup or bottom surface is covered with a disk also, for the purpose of providing an electrical contact. A binding post may be attached to the fibre so as to make contact with the cover or outside disk and another should be placed so as to make contact with the inside disk. Then a metal rod should be secured to the outside disk at its center which is the means for picking up the vibration of the engine parts.

1913 HALLADAY WIRING

Q—Publish wiring diagram of 1913 Halladay.—W. E. Steel, Hartford, Mich. Shown in Fig. 6.

REO 1918 DIAGRAM

Publish wiring diagram of a 1918 Reo speed wagon.—J. Shelby, 83 Market Avenue, Memphis, Tenn.

Wiring diagram of the 1918 Reo speed wagon is shown in Figs. 7 and 10.

CHALMERS WIRING DIAGRAM

Q—Publish a wiring diagram of the 1915 Chalmers Master Six.—E. Christensen, Tacoma, Wash.

Shown in Fig. 9.

ABBOTT DETROIT WIRING DIAGRAM

Q—Publish wiring diagram of a 1914 Abbott Detroit type 44 five-passenger touring car.—Dr. F. J. Harris, Providence, Rhode Island.

See Fig. 5.

TWO SPARK IGNITION

Q—Is it possible to use two spark plugs to each cylinder of a Ford engine by connecting them with the Ford magneto or is an extra magneto required for the extra plugs?

2—Can a storage battery be used instead of the Ford magneto? Will it give better results for ignition?—Charles F. Weitzel, Pleasant Hill, Mo.

1—The Ford magneto is not designed to provide current for two spark plugs per cylinder and, therefore, if two spark ignition is desired it will be necessary to provide an independent battery system for one set of plugs and use the regular magneto for the other set or install a two spark magneto.

2—Yes. There is a great difference of opinion as to whether the battery ignition systems are better than the magneto systems or not and, of course, the manufacturers of each claim their system is the best. However, both systems are giving highly satisfactory results.

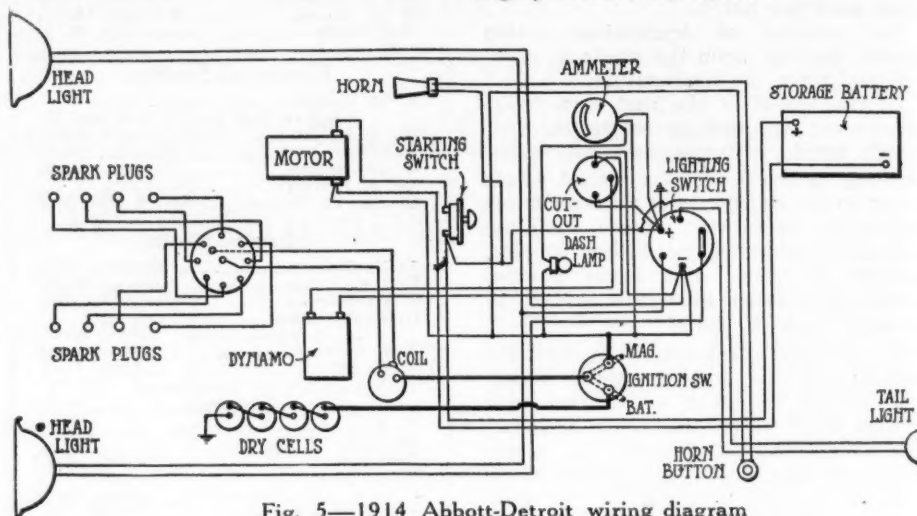
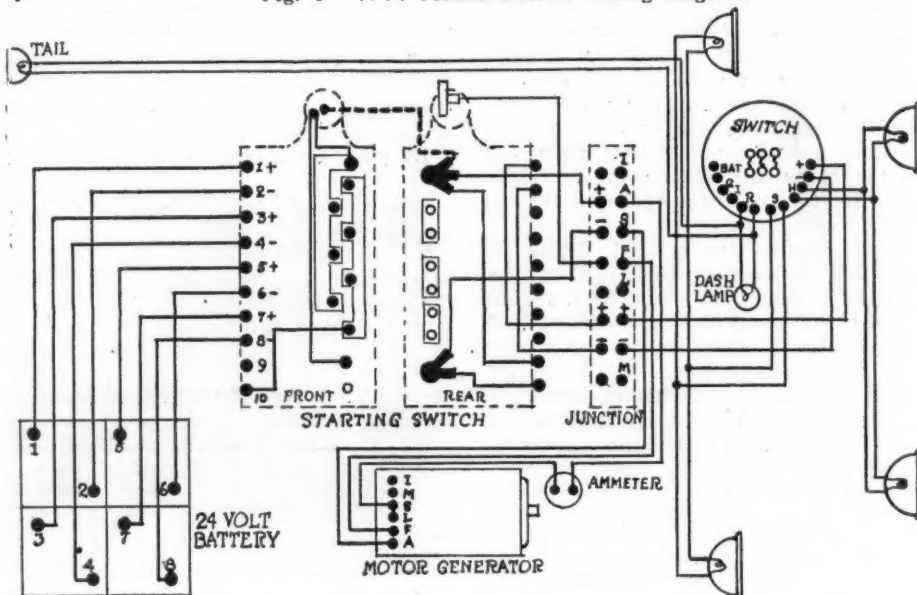
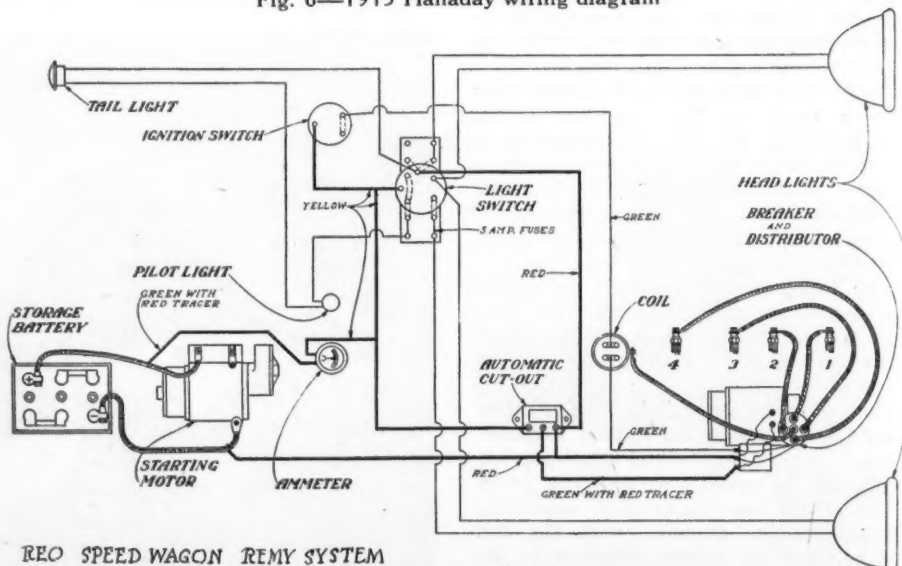


Fig. 5—1914 Abbott-Detroit wiring diagram



HALLADAY 1913-14

Fig. 6—1913 Halladay wiring diagram



REO SPEED WAGON REMY SYSTEM

Fig. 7—1918 Reo speed wagon

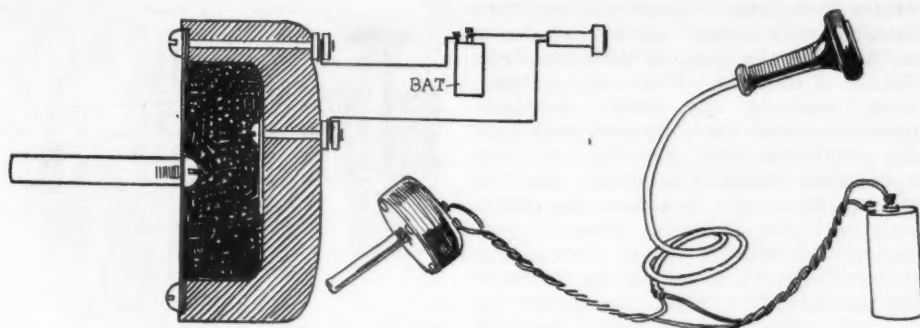


Fig. 8—Electrical sounding tool

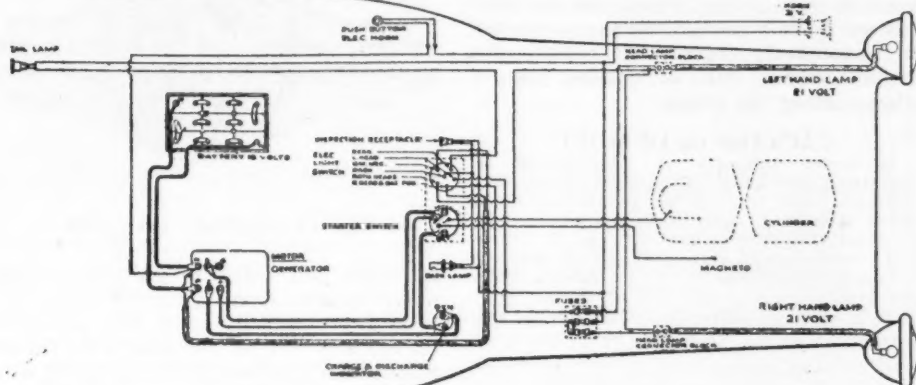


Fig. 9—1915 Chalmers Master Six wiring diagram

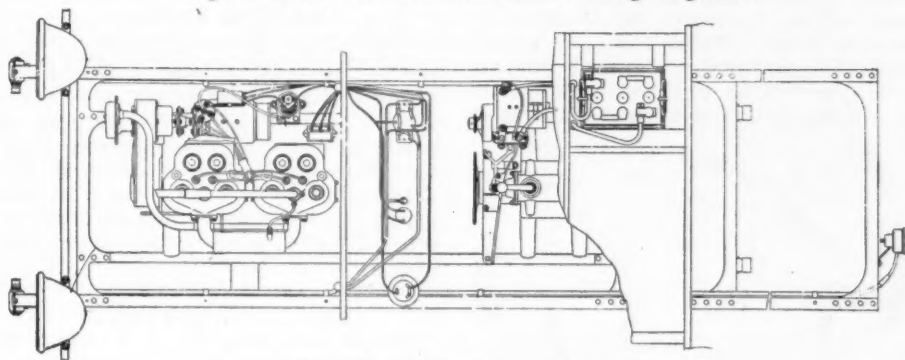


Fig. 10—1918 Reo speed wagon

MISCELLANEOUS

HUPP AXLE ADJUSTMENT

Q—Publish diagram of the drive shaft and rear axle of Model K Hupmobile, showing adjustments. —Leslie Cramer, Edenton, Ohio.

Except possibly in the case of an accident, such as would necessitate the installation of new gears in the rear axle, it should not be necessary to make an adjustment of the bevel driving gears until the car has been driven thousands of miles. If for any reason it does become necessary to make this adjustment, it can very readily be done as follows:

To move the drive pinion in or out, first remove the clamping bolt and lock, through which the clamping bolt passes from the front end of the rear axle housing, then by using a punch, the large slotted nut may be turned in or out. Screwing this in a right-hand direction causes the pinion to be moved back in closer mesh with the large bevel gear.

Turning it in a left-hand direction draws the pinion out of the way from the large bevel gear. After the adjustment is made, be sure that the lock and clamp bolt are properly replaced.

If it is desired to move the entire differential unit to one side or the other, this adjustment may be brought about by removing the rear axle cover and loosening the nut on one side of the differential and tightening the nut on the other. The differential will move toward the nut which is tightened. Unless you are confident which way you desire to move the differential unit it probably would be best to remove the rear axle shafts and disconnect the rear universal joint. Then by removing the twelve nuts holding the differential to the front of the rear axle housing, the entire unit can be removed. This will then allow the entire differential and short driving shaft

to be taken to a bench and carefully adjusted, after which the axle can be reassembled.

An illustration of a diagram of an axle used in this model is not available.

CLUTCH ADJUSTMENT

Q—Illustrate and give adjustments of the 1919 Buick clutch.—Earl V. Zacher, Mulvane, Kans.

A gasoline engine cannot be started under load and, therefore, it is necessary to provide a mechanism between the engine and transmission which can be easily controlled. This mechanism is known as a clutch and is usually of the friction type that can be released by pressing down on the clutch pedal. Refer to Fig. 11 which is the 1919 Buick clutch. The clutch consists of a series of steel plates, operating between steel plates faced with asbestos friction material, which are connected alternatively to the flywheel or the clutch shaft of the transmission.

When the clutch is engaged, a spring forces the plates together so they revolve as a unit with the flywheel of the engine but when the clutch pedal is pressed down, the plates separate, those connected to the flywheel continue to revolve while those connected to the transmission are stopped.

In the course of time the friction facing on the clutch discs becomes worn and when this occurs the clutch should be adjusted to prevent slipping. Adjustment can be made by moving lock nut and adjusting nut on the clutch release rod to allow more clearance between the clutch release bearing and the plates. When properly adjusted there should be $1/32$ in. clearance between the ball thrust bearing and the rear plate against which it operates.

The position of the clutch pedal can be adjusted by means of the set screw in the rear end of the clutch release rod. This is a dry disc clutch and should never have any oil put on the plates. The clutch is lubricated by two grease cups, one located on the clutch release yoke pin and one on the clutch release bearing retainer, both of which should receive attention at least every 500 miles.

STRENGTHENING WELDED CRANK-CASE ARM

Q—Am overhauling a Dodge on which the transmission case arm is broken. The arm has been welded and reinforced. Suggest best method of making a transmission case support for it, similar to those on the market for Fords.—S. W. Moebius, Frisco, Utah.

If the weld is properly made there is no reason to doubt that the crankcase arm will be less strong than it was before the break occurred. However, we make a suggestion for further strengthening the crankcase arms which is shown in Fig. 12. A piece of strap iron measuring $\frac{3}{8}$ in. in thickness and $1\frac{1}{2}$ in. in width should be fitted to the bottom portion of the flywheel housing. Then the strap iron should be bent up and over the side of the frame where holes should be drilled to accommodate the crankcase hold-down bolts. By placing the large washer under the strap iron at the position directly under the hold-down bolts

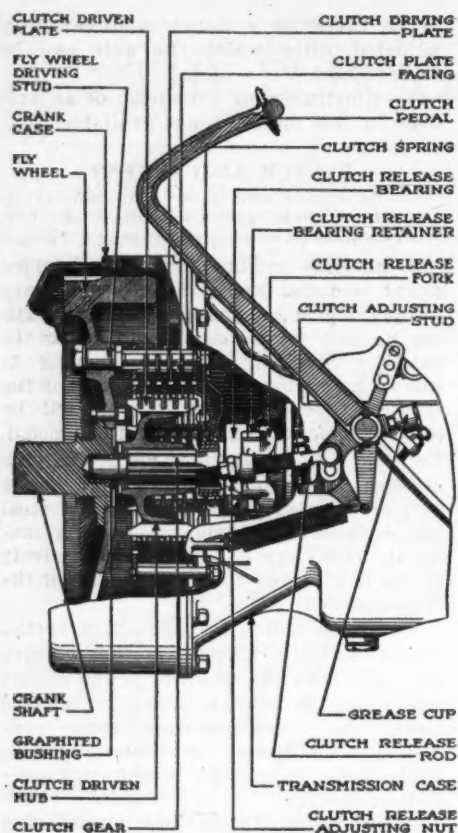


Fig. 11—Showing clutch adjustments of the 1919 Buick

and using a longer bolt, a staying effect will be obtained that will pull up on the crankcase and thus relieve the stress on the arm.

CLUTCH BRAKES CAR

Q—As soon as the clutch pedal on a 1917 Dodge is pressed down, the clutch stops dead and acts as a foot brake on the car. It has been inspected but not dismantled and nothing wrong can be found. —Oscar A. Olsen, Milton Garage, Milton, Minn.

The first question in our minds is whether you have a cone clutch or a disc clutch. According to our records this car is supposed to have a disc clutch. However, we have had reports of this

nature from Dodge owners that had cars equipped with a cone clutch which leads us to believe that you are mistaken about the age of your car. When cone clutches were used by the Dodge company numerous cases were reported very similar to the one you describe, and they were easily remedied by simply instructing the driver not to throw the clutch out the entire distance. There is just one other possibility we can think of and that is the brake pedal may be frozen to the clutch shaft, in which case the brakes will act every time the clutch pedal is thrown out. If the clutch pedal does not seem to be in proper adjustment and does not act quickly enough, the thrust washer is undoubtedly worn. To replace the thrust washer will, of course, require dismantling the clutch.

PACKARD GEAR SHIFT

Q—Some difficulty is experienced in shifting the gear of a 1914 6-cylinder Packard car to reverse position. Even after the gear is shifted it is necessary to hold the shift gear lever or it comes out immediately. Is there any way of repairing same? —J. K. Araki, Hilo, Hawaii.

It is very probable that the trouble you are experiencing is caused from the gear shifter shaft being worn which prevents it from remaining in position. The gear shifter shaft is provided with a lock which determines the correct engagement of the gears for any forward or reverse speed. These locks are spring controlled plungers which drop into annular grooves on the gear shifter shaft. If it is found that the toggle connections

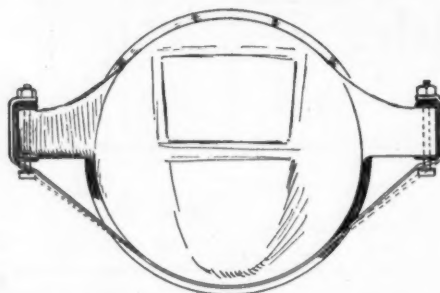


Fig. 12—Suggestion for strengthening welded crankcase arm

ENGINES

REBORING TWO CYLINDERS

Q—When in good shape how many miles per hour will a Stutz touring car, No. 3219 Series 4C, make?

2—What horse power is the engine?

3—Could the two front cylinders be rebored?

4—Would higher gear ratio increase speed?

5—Please publish speedster design for this model.—C. B.

1—This engine is rated according to the N. A. C. C. formula at 36 horse power but was advertised as developing 50 horse power.

2—When in good condition this car will probably make in the neighborhood of 60 miles per hour.

3—The front two cylinders can be re-

bored but we do not think it advisable to rebore two cylinders and leave two cylinders as they are. Since it is evident that the block needs regrounding or reboring the job should be completed on all cylinders and over-size pistons fitted.

4—Changing to a higher gear ratio will give more speed but it will be impossible to throttle the car as low as you can now. You will lose acceleration and it will be much more difficult to climb the hills on high gear.

5—Several very attractive speedster designs have been built by the Stutz company and we believe you could do no better than rebuild your car along these lines.

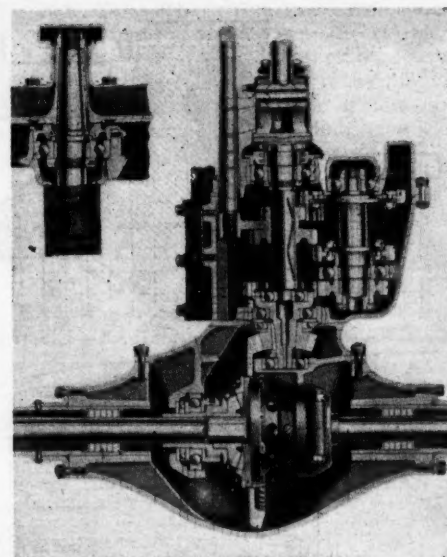


Fig. 13—Packard gear shift

the worn sufficiently to prevent the annular groove from engaging with the locking pin then the shaft will not fully engage and will be very apt to fly out of position. The illustration in Fig. 13 will assist no doubt in determining and locating the trouble.

DRIVING SIGNALS

Q—Illustrate correct position a driver should hold his hand when turning right, left and stop.—A. E. Scott, Albia, Ia.

There is really no official code. The signals merely have the sanction of usage and vary considerably with locality. However, the wise motorist will accept the extended hand as a caution signal and will wait to be sure what the other driver is going to do before going ahead.

NASH TORQUE CURVES

Publish power and torque curves of the Nash engine.—Dr. George W. Norris.

The horsepower and torque curves of the Nash engine are shown in Fig. 14. It will be observed from this that the engine hp. is 67 at an approximate engine speed of 2600 r.p.m.

CHANGING ENGINES

Q—We wish to install a Chevrolet engine in a Ford truck chassis but are puzzled as to means of connecting a Ford universal to Chevrolet transmission. Could the front end of the Ford transmission be connected to Chevrolet crank shaft flange or clutch hub or would a special universal connection be necessary? —Grimes Auto Co., Newark, Ark.

A change of this kind involves many difficulties and is hardly worth while. Not only is it necessary to provide a special universal connection but the Ford magneto will have to be moved, a new flywheel built and a new clutch installed. The front end of the Chevrolet transmission is provided with a splined connection while the rear end of the Ford crankshaft is provided with a flange connection.

As a whole we should say that a rebuilt job that consists of a miscellaneous assortment of parts and units will never be very successful and furthermore it costs so much to have the job done that it is not worth while.

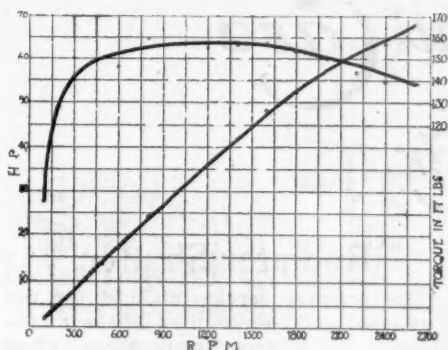


Fig. 14—Nash horsepower and torque curves

STAHL RECTIFIER

Q—Publish illustration of the Stahl Rectifier, and explain how the revolving commutator rectifies the A. C. current to D. C.—Frank Cais, 1770 Hanover St., Aurora, Colo.

The Stahl rectifier changes alternating current to direct current for battery charging by means of a revolving commutator. It is nothing like a motor generator, and it is claimed that 90 per cent of the alternating current is turned into direct current as against the motor generators approximately 55 per cent.

A small synchronous motor of $\frac{1}{4}$ to $\frac{3}{4}$ hp. serves to turn the commutator. The current which is being rectified for charging the batteries does not pass through the motor. It is reduced by a transformer to approximately the voltage required for charging, then passes to the commutator, being collected to the commutator as direct current by brushes. Voltage reduction is, therefore, brought about principally in the transformer making unnecessary a wasteful resistance in the battery circuit.

The rectifier which we have shown in Fig. 16 is the model S X. It is claimed to take 3577 watts from the power line and deliver 3220 watts. On the motor shaft of this rectifier are three rectifying commutators with $\frac{1}{4}$ section dead, thus producing a pulsating current, allowing charging at a higher rate without overheating the battery. Any combination of battery 18 to 33 cells can be charged on each circuit. With the use of the independent regulator for each circuit, these three circuits can be charged at any rate from 4 to 12 amperes.

It is impossible for us to go into the full details of this machine to show you how the current is rectified, but we will say that it is based on the principle of the synchronous motor driving and commutator simply turns one-half way up-side down and gives a pulsating direct current. Fig. 15 shows one of the smaller rectifiers.

HUPP VALVE TIMING

To time a Hupp 32 (using the diagram printed in MOTOR AGE Oct. 7, 1920, page 36). Remove chain cover over flywheel, remove distributor (F), remove timer cover, remove plate over transmission gears, and the plate covering the valve push rods. You will then have everything open as in diagram No. 1. Turn the motor over until connecting link appears; remove the pin and fasten a short piece of wire to each end of the chain

allowing it to drop down free of the crankshaft sprocket. You are now ready to place the cam, flywheel and the magneto sprockets in their correct relative positions.

Now turn motor over until the figures 1414 appear on EC10 the flywheel in the same relative positions as shown in the picture. You have now placed the flywheel in the correct position. Then by turning the cam wheel at the front of the motor to the right until the exhaust valve or the one nearest the front, on the first cylinder has just closed and the intake valve or the one second from the front of the motor is just ready to open.

You have then placed the cam in the correct relative position. Last of all retard lever (D), turn magneto sprocket till red fiber on the breaker bar is at top of timer box. Notice that the spark gap is ready to open and distributor is at

point (E) to correspond with No. (4) on distributor block (F). You can now pull up the chain and insert pin, taking care that none of the parts that have been placed in position have not been disturbed. The motor is then correctly timed.

After you have completed the foregoing if there is much play in the chain you should loosen the four nuts that hold the magneto in position and insert shims at point (4).—Richard Jepsen, 2502 Cumming St., Omaha, Neb.

Editor's Note: There is no one that can do all the necessary work on all makes of cars in the most efficient way. The man who spends most of his time working on one particular make of car will become very efficient and he will discover the simplest way to accomplish certain necessary operations of repair. This is the situation in the above case. The explanation of the Hupp valve timing given is simple and effective and will be information that is extremely valuable to the average mechanic.

STARTING MOTOR FAILS

Q—Explain why the starting motor stops when the motor brush makes contact. The ammeter at this time was 0. When the engine has warmed up the starter will crank the engine easily. —Walter Madin, Moline, Ill.

Lack of detail makes it impossible for us to give a definite answer but we can give a few possible causes for the trouble. As a usual thing this action indicates a weak storage battery. If it is battery trouble it is quite natural that after the engine has run a few minutes and loosened up, the starting motor will crank it very easily. If the armature of the starting motor does not revolve at all when the starting switch is closed it is advisable to examine the switch and make sure that the contacts are in good condition.

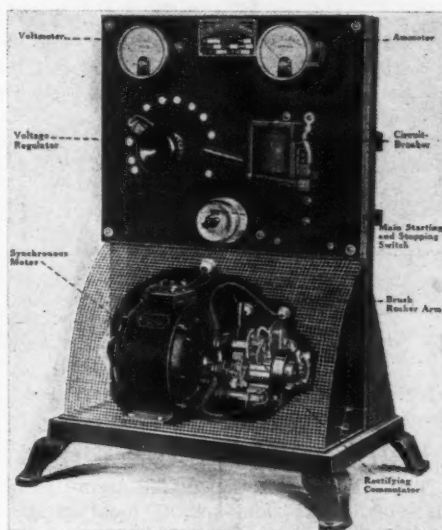


Fig. 15—Model SX Stahl rectifier

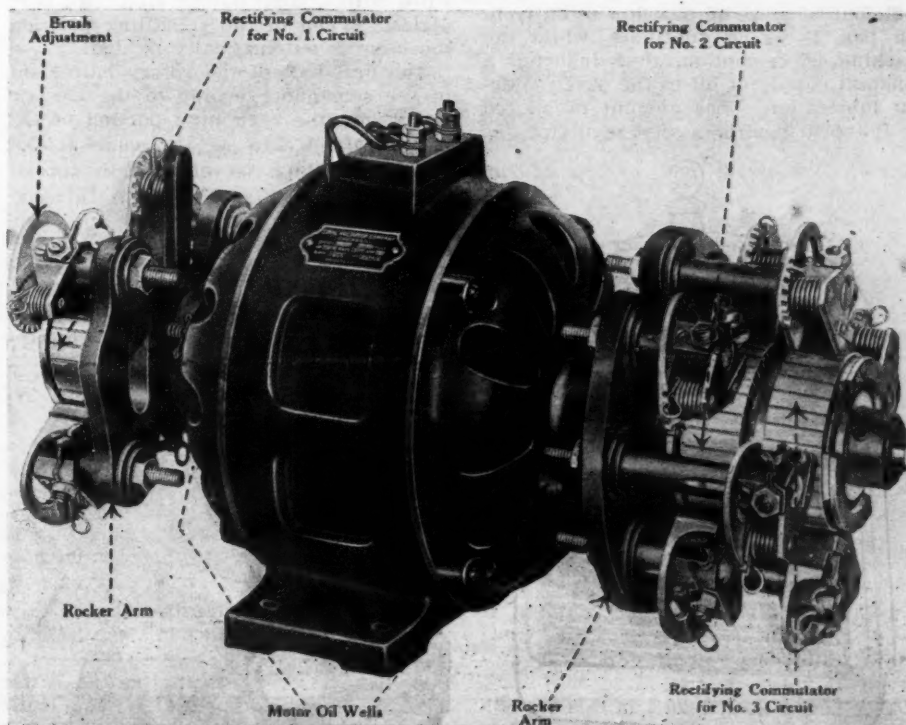


Fig. 16—Model M. Stahl rectifier

The Accessory Show Case

New Fitments for the Car

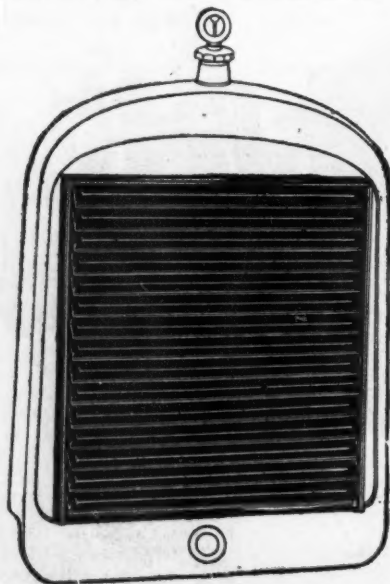
Radium Gage

Radium illuminated instruments now are one of the essentials of car equipment, and a new device in this line is a radium luminated dial and pointer which makes the gage legible at night. The undark radium luminous material on the dial and pointer is the same sort of lumination as used on ship navigation dials, wrist watches and the like. It is said radium dials can be read no matter where the instrument is, or what the climatic conditions. The only essential is that there be no other light than that given by the glow of the undark material itself. It is the product of the Radium Luminous Material Co., 58 Pine Street, New York City.

Vanoiler

A new system of automatic lubrication, known as Vanoiler, has been placed on the market by the Advanced Products Corp., Philadelphia. The action of the device is dependent upon the vibration of the car, and when the car is not in operation lubrication automatically ceases.

In the cross section view where the cap A screws down tightly on the cup D, it presses on a steel spring B which releases the valve C and starts the flow of oil to the pan F. When the machine is at rest an automatic seal is formed which keeps the oil from running through the bottom of the cup C. When the machine is in motion, however, the vibration is sufficient to cause an overflow of oil from the pan F which continues while the machine is in motion, thus insuring a constant supply of oil to the part requiring lubrication. The amount of oil fed to the bearings is easily regulated, as



Universal radiator shutter



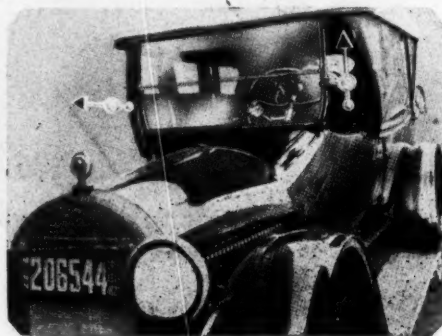
Radium gage

the sensitivity of feeding is adjustable by moving centerpiece E up or down which raises or lowers the constant oil level in the pan F.

Hankee Traffic Signal

The Hankee electric traffic signal consists of a "left" and "right" location and is controlled by a switch. To operate, the switch is turned to the right or left, and the corresponding semaphore is provided with a lamp having front and rear plates. When in the signalling position the lamp is automatically lighted.

The first half of the rotary movement of the semaphore is due to the electric motor and the remaining portion of the movement is due to the cam action. When the signal is returned to normal position the cam action, having already moved up, being on reverse position, induces a reverse action to the electric motor which is responsible for the signal being returned to normal position. The signal sells for \$25 and is made by the Hankee Electric Mfg. Co., Inc., Minneapolis.



Hankee traffic signal

Radiator Shutter

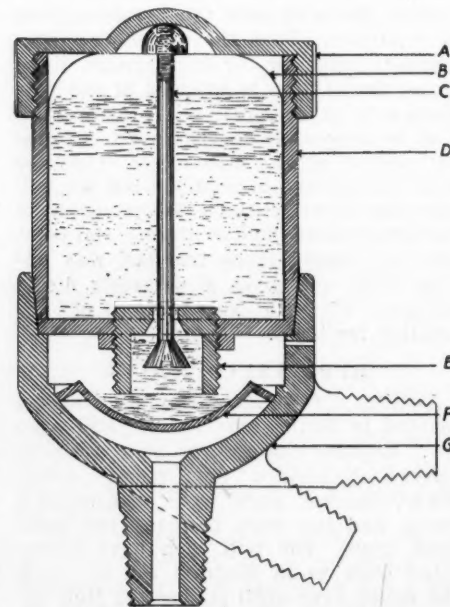
The primary service claimed for the Universal radiator shutter is the maintaining of correct temperature when driving and retaining heat when the car is standing idle, thus making it possible to restart with a warm motor on a cold day after a lengthy stop. It is operated from the driving seat. To install this shutter it is only necessary to remove the radiator shell and after replacing the shell the job is completed by installing the control rod through the dash of the car. The Universal radiator shutter is made for fifteen makes of passenger cars, prices ranging from \$8.50 for the Ford to \$18.00 for the Nash car. Manufactured by the Auto Metal Parts Co., 624 Michigan Avenue, Chicago.

Windshield Wing

A new type of windshield wing has recently been placed on the market by the Weston Mfg. Co., of St. Louis. The wing is designed to fit the contour of the body and tapers off so that it properly matches the windshield bracket. Because of this design all disturbing air currents are deflected from the driver which would naturally tend to make driving a greater pleasure. These wings are listed at \$16 and \$30.

Sure-On Tire Saver

The Sure-on tire saver can be used on old or new tires without vulcanizing. Lacing and cementing is not required to hold the shoe securely in place. This device is the product of the Sure-on Tire Saver Co., Chicago.



Vanoiler system

Service Equipment

Time Savers for the Shop

Battery Service Station Equipment

This apparatus, Fig. 1, is designed to operate with gasoline, city gas or electric current, and is shown installed ready to operate. By turning on water valve "A" the water comes up into water glass "B," and is kept at the proper level by an automatic valve which is located in supply tank "C." To start the burner, open door "D" and then close it. This operation is necessary only once a day as the burners are equipped with self-starting devices. Above the boiler is a large

chamber for the heating compound and from this chamber a pipe leads to the outside of the building carrying off all poisonous gases.

To dismantle a battery, place the battery on bench and put hose nozzle into it. If it is a three-cell battery put the other three nozzles into a jar of water which prevents steam from escaping. The battery will now receive superheated low pressure steam. If it is desired to soften a jar, place jar softener "E" on top of battery for a few moments. Hose "G" is placed in the bottle for receiving distilled water. The water flows through the condenser "H" to the

supply tank and from there to the jar cleaner "I."

For cleaning by means of the automatic jar cleaner the jar is placed above the cleaner and pressed down. The automatic valve opens and shoots water up into the jar, causing settlings to fall into the box. Fig. 2.

Atlas Crankshaft Grinder

The Atlas crankshaft grinder, an abrasive tool, is designed for use in truing up bearings and pins. It requires no extra equipment and no special tools for the job of crankshaft grinding, and may be accomplished without removing the engine from the car or the crankshaft from the engine. The Atlas tool has but one cutter, which cuts in one direction only, and is adjustable by the same sense of feel that is used when operating a micrometer. It is manufactured by the Atlas Mfg. Co., Pittsburgh.

U. S. Carbon Removing Apparatus

With this outfit it is claimed carbon can be easily and completely removed from cylinders. The apparatus consists of a torch fitted with a shut-off valve, an extra long flexible copper tubing, and a 3 in. oxygen regulator. It is said a four or six-cylinder engine can be cleaned in 30 min. The United States Welding Co., Minneapolis, Minn., sells the outfit complete for \$20.

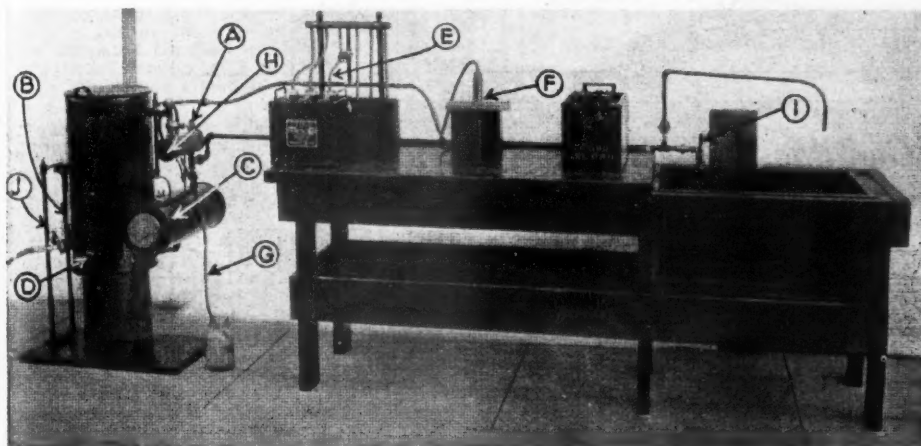
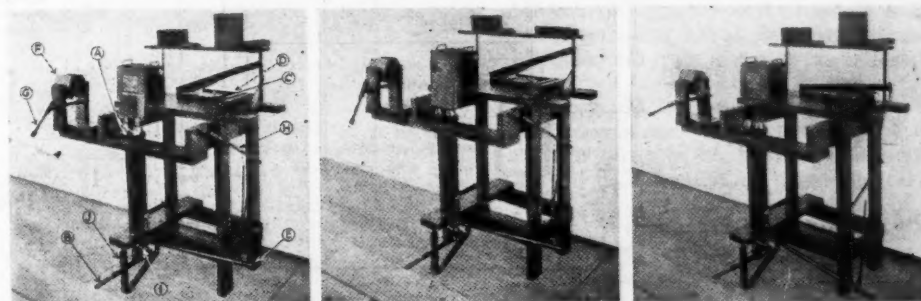


Fig. 1—Apparatus for dismantling batteries

Battery Machine for Cutting Separators

The illustrations, Fig. 3, show the apparatus set up and ready to operate. Positive and negative groups are slipped together and posts placed in the adjustable chucks "A." Then foot lever "B" is pressed down and size of separator required is measured. Adjust gage "C" to the proper size, put separators up to adjustable stop "D," press down foot lever "E" and cut up separators required to complete battery. Then place the separators between the plates, slip the jar over groups, release foot lever "B" and set jar in battery box. If the jar will not go over the groups, it is an indication of warped plates.

In this case bring press "F" over the groups, turn to the right on screw "G" and release foot lever "B." Then turn the groups out of the adjustable chucks "A" and place another set of groups into chucks "A." Fill with separators, place jar over groups, release lever "B" and set jar into battery box. Now turn back the press which will place groups in the adjustable chuck "A." Then press down



foot lever "B," turn screw "G" to the left, turn back press "F," place jar over group, release foot lever "B" and place jar in battery box. Release lever "H" when machine is not in service as this closes the cutting knife.

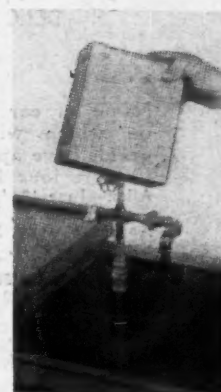
The machines described above are manufactured by the Wherland Mfg. Co., Minneapolis, Minn.

Valve Seat Facer

The Hoerner adjustable valve seat facer which was described in MOTOR AGE Oct. 7 is manufactured by the Hoerner Mfg. Co. of Los Angeles.

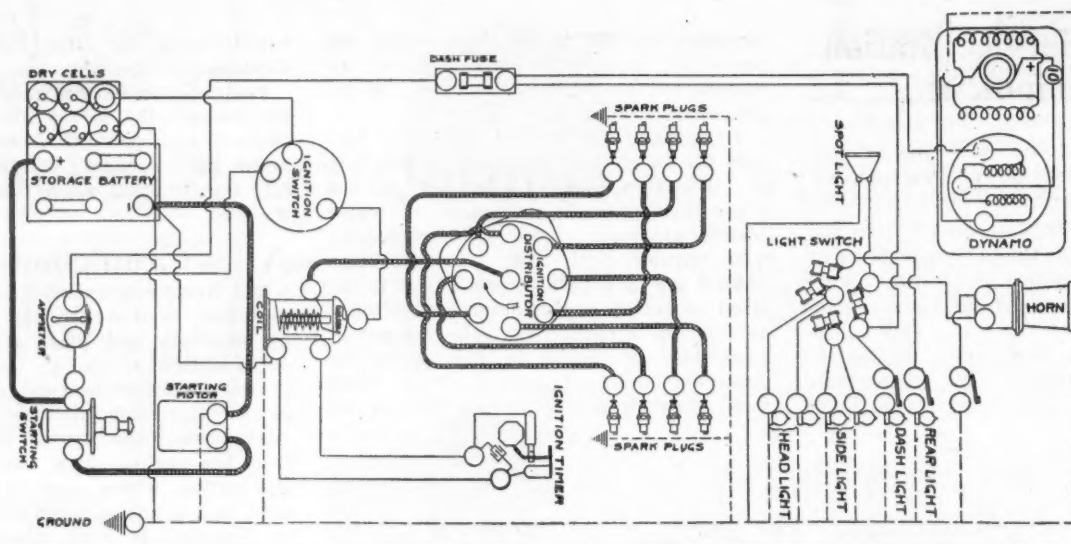
Fig. 3—Above: Battery machine for cutting separators

Fig. 2—At right: Automatic jar cleaner used in connection with apparatus in Fig. 1

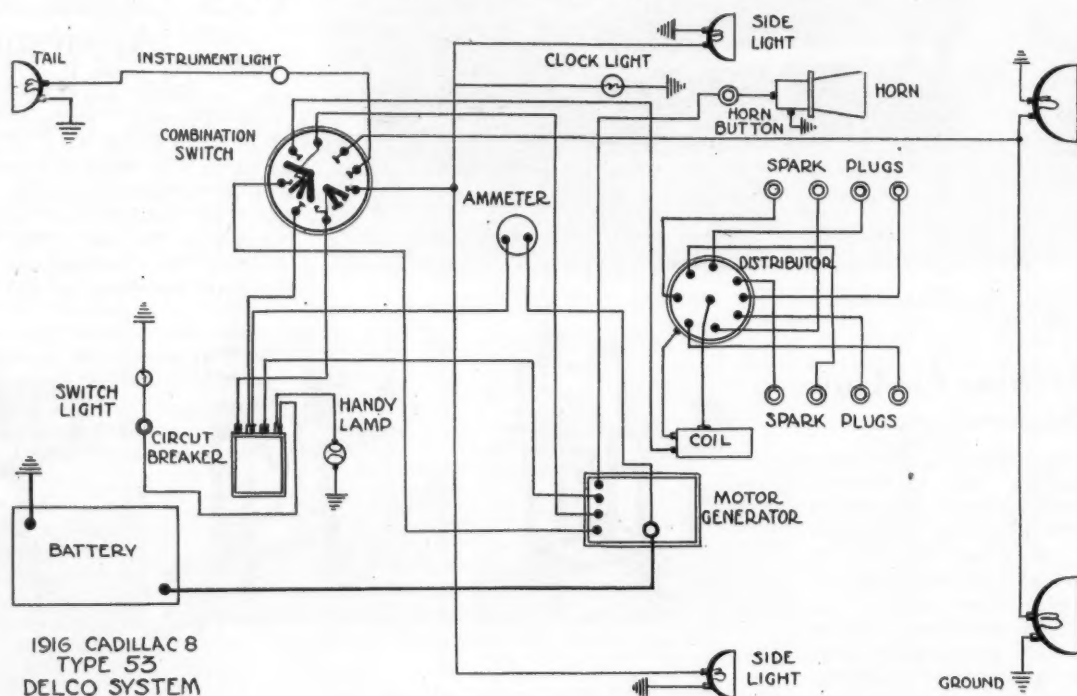


Motor Age Weekly Wiring Chart No. 104

1917 Peerless With Gray & Davis and Atwater Kent Systems



1916 Cadillac Using Delco System



1916 CADILLAC 8
TYPE 53
DELCO SYSTEM

Name of car and date on which wiring diagrams have appeared in previous issues

Allen—June 17, '20
Sept. 30, '20
Apperson—Aug. 5, '20
Briscoe—May 6, '20
Buick—July 15, '20
Case—Aug. 5, '20
Oct. 7, '20
Chalmers—June 17, '20
Chandler—May 20, '20
Cole—June 10, '20
Crow-Elkhart—July 29, '20

Davis—Aug. 12, '20
Sept. 2, '20
Dort—Aug. 12, '20
Dodge—Sept. 23, '20
Nov. 11, '20
Elcar—May 6, '20
Oct. 28, '20
Franklin—June 3, '20
General Battery Charging—
Sept. 15, '19
General Magneto Diagram—
June 15, '19
Grant—Aug. 12, '20
Harroun—July 15, '20
Haynes—June 24, '20

Internal Connections—
July 10-17-24, '19
Jeffery—May 13, '20
Jordan—June 10, '20
July 22, '20
King—May 20, '20
Kissel—May 27, '20
Aug. 19, '20
Oct. 21, '20
Lexington—July 29, '20
Locomobile—June 3, '20
Moline-Knight—May 20, '20
July 22, '20, Nov. 4, '20
Moon—July 29, '20
Aug. 19, '20
Sept. 2, '20

Moore—Nov. 11, '20
Oldsmobile—Sept. 16, '20
Packard—Oct. 7, '20
Peerless—May 13, '20
Pierce-Arrow—July 15, '20
Reo—July 22, '20
Roamer—Aug. 5, '20
Sept. 30, '20
Oct. 21, '20
Saxon—Sept. 9, '20
Scripps-Booth—Aug. 26, '20
Stearns—Nov. 4, '20
Stephens—Sept. 16, '20
Studebaker—July 1, '20
Oct. 28, '20
Stutz—July 8, '20

Law in Your Business



By Wellington Gustin



Municipality Responsible for Negligent Acts of its Servants

Failure to Employ Latest Devices for Accident Prevention Constitutes Negligence

SEVERAL days ago a local garage man took out my car for the purpose of testing it. I am a tourist and had left the car in his possession for that purpose. It is admitted that he was driving north on Cascade Avenue at about 10 or 12 miles per hour. The city fire department at that time came west on Bijou Street, an intersecting street, the chief's car being somewhat in advance of the trucks. The chief's car was traveling at a very high speed. At, or approximately at, the moment when the front wheels of my car were on line with the north curb of Bijou Street, the chief's car struck mine at a point approximately midway of its length. My car was knocked sideways 30 ft., after which it struck the curb and overturned.

First: Considering the width of the street, which was very wide, especially to the west of the point of accident, and considering the position of my car with respect to the Bijou Street curb, there was plenty of room for the chief to have passed behind my car. This he neglected to do.

Second: Although the rest of the city fire apparatus was painted a distinctive color, for the protection of the public, the chief's car was not so painted. It was of a Scripps-Booth mud color.

Third: The chief's car was not equipped with a siren or a similar warning device. I understand it did carry a horn of some sort but that this was inadequate, especially in this instance. Witnesses declare that the chief was not sounding any warning when he was approaching the intersection. The garage man declares he heard no warning. The department declares that the sirens on the trucks, which they claimed were shortly in the rear (I cannot learn for myself just what the relative positions were) served as adequate warning. However, it is admitted that the chief's car was unequipped. Further, the department implicitly admits the desirability of such equipment, for they declare that a siren was on order for the chief's car.

Fourth: The department claims immunity on the following grounds:

(A) Being that the fire department was answering a call.

(B) Being on the right of the other driver.

With regard to (B) consider the position of my car and the time it was struck. Further consider the relative speeds of the cars, probably 4 to 1. Also it would seem that my car had the right of way by virtue of approaching the intersection in advance of the car on its right by at least the required 15 ft.

Now, I am appealing to you for whatever advice or "tips" you may have to offer on no mercenary grounds whatso-

SEEMINGLY knotty legal problems are constantly arising in the dealer's business, which even a slight knowledge of the law easily may solve. *MOTOR AGE* presents here the most common legal problems which confront the dealer. Mr. Gustin, a member of the Chicago bar, not only is well versed in the law relating to the dealer, but presents it in such a way as to be readily understood by the layman. In addition to his articles, Mr. Gustin will gladly answer such individual inquiries on knotty problems as may be submitted him.

ever. The garage man (Ray Hermann, the Hudson dealer in this city) has, without a squibble or evasion, admitted his responsibility to me. He, and the boy who was driving the car, have offered more than I shall accept. This refusal on my part is by no means prompted by any feeling that I am not entitled to the extra service offered, but rather in recognition of the spirit that they have shown and by disinclination to impose upon their somewhat modest establishment what may be a hardship.

I am, therefore, asking for this service entirely in the interest of Mr. Hermann, and without any solicitation from him.

I will add that I have talked with many citizens here (taxpayers) and without exception they declare the city should pay. Of course, they, like myself, necessarily base their judgment on moral grounds. Several have expressed real indignation over the conduct of the governing body in the city hall.

As I say, I have nothing to gain in this matter. I want to help the garage and, incidentally, to show the city they cannot "put it over" in this way.—H. W. McClure.

The facts you present indicate a case of negligence against the city named.

Under the first proposition you made out a clear case of negligence on the

part of the fire chief. Of course, it would be up to you to prove the case as you have presented it. Nothing else entering in, it was the clear duty of the chief to avoid the collision by turning behind you.

I doubt it being negligence for the chief to drive a car which was not painted bright red. That might add weight to your case, however, in showing your driver's negligence in failing to give right of way.

Negligence has often been founded on the failure of one to employ the best and latest devices for the prevention of injuries. The fact that the chief had ordered a special warning device for his car would not prevent him from answering calls before the receipt and installation of such device, but answering a call does not relieve the chief and city of responsibility for negligence in so doing.

Again it appears that there is a disputed question as to whether adequate warning had been given of the approaching car of the fire chief.

Regarding the fourth proposition: The fire department is not relieved of any responsibility in answering calls. They are given the right of way, this taking precedent over the ordinary rules of the road from the fact of public necessity and safety, but they are not vested with the right to destroy property.

However, it may be that your drivers were guilty of negligence in failing to note the approach of a fire department, in failure to hear its warning or in attempting to cross the street in advance of the department. Contributory negligence may be a complete defense. The garage would be responsible to you providing they had been negligent contributing to the accident. That would be a defense for the fire department.

A municipality is responsible for the negligent acts of its servants and should be made to pay where injury results to individuals. Your case seems to be a question of facts. You make out a good case, unless contributory negligence enters in.

Gear Ratios of 1920 Trucks

Motor Age Maintenance Data Sheet No. 124

One of a series of weekly pages of information
valuable to service men and dealers—save this page

Continued from Last Week

Trade Name	Model	Capacity	1st Speed	2nd Speed	3rd Speed	4th Speed	Reverse	Rear Axle Ratio
Capital.....	G	1½	5.2	3.6	1.8	1.	4.6	....
Capital.....	K	2½	5.2	3.5	1.8	1.	4.6	....
Capital.....	M	3½	5.4	3.8	1.9	1.	4.8	....
Capital.....	H	2½	5.1	3.6	1.8	1.	4.6	....
Champion.....	....	3/5	3.0	1.7	1.	....	3.4	5.25
Chicago.....	C	1½	3.3	1.7	1.	....	4.3	7.75
Chicago.....	C	2½	4.0	2.6	1.5	1.	5.2	8.50
Chicago.....	C	3½	4.8	2.8	1.7	1.	5.6	10.33
Chicago.....	D	5	4.8	2.8	1.7	1.	5.6	13.66
Climber.....	A-1920	1½	2.6	1.7	1.	....	3.4	....
Clydesdale.....	32X	1	3.33	1.68	1.	....	4.35	7.25
Clydesdale.....	42	1½	3.33	1.68	1.	....	4.35	7.00
Clydesdale.....	65X	2½	4.	2.62	1.5	1.	4.81	8.50
Clydesdale.....	90	3½	4.84	2.84	1.5	1.	5.81	10.33
Clydesdale.....	120B	5	4.84	2.84	1.5	1.	5.81	11.67
Columbia.....	F	1	2.8	1.77	1.	....	3.60	7.70
Columbia.....	G	2½	5.2	3.68	1.86	1.	4.66	9.40
Commerce.....	E	1	3.2	1.87	1.	....	3.88	7.10
Commerce.....	EP	1½	3.2	1.87	1.	....	3.88	7.10
Concord.....	A	1½	4.0	2.62	1.5	1.	4.81	7.75
Concord.....	B	2½	4.0	2.62	1.5	1.	4.81	8.50
Conestoga.....	12	¾	....	....	....	....	....	6.50
Conestoga.....	20	1	2.9	1.6	1.	....	3.4	7.75
Conestoga.....	30	2	3.0	1.7	1.	....	3.5	9.66
Continental.....	W	1½	4.5	1.87	1.	....	4.5	....
Cook.....	41	2	5.2	3.6	1.8	1.	4.3	....
Corbitt.....	E	1	3.	1.7	1.	....	3.5	6.50
Corbitt.....	D	1½	3.	1.7	1.	....	3.5	8.67
Corbitt.....	C	2	3.36	1.76	1.	....	4.32	8.75
Corbitt.....	B	2½	4.	2.62	1.5	1.	4.81	8.75
Corbitt.....	A	3½	4.	2.62	1.5	1.	4.81	11.75
Corbitt.....	AA	5	4.84	2.84	1.5	1.	5.81	11.75
Dart.....	S	1½	3.	1.7	1.	....	3.5	7.50
Dart.....	M	2½	4.8	3.	1.6	1.	6.5	8.50
Dart.....	W	3½	6.	3.2	1.7	1.	6.3	8.75
Day-Elder.....	A	1	3.66	1.91	1.	....	4.46	7.75
Day-Elder.....	B	1½	3.66	1.91	1.	....	4.46	8.33
Day-Elder.....	D	2	4.75	2.69	1.60	1.	5.94	7.67
Day-Elder.....	C	2½	4.75	2.69	1.60	1.	5.94	8.67
Day-Elder.....	F	3½	4.	2.62	1.50	1.	4.81	10.10
Day-Elder.....	E	5	4.84	2.84	1.50	1.	5.81	8.75
Dearborn.....	F	1½	3.	1.7	1.	....	3.5	8.33
Dearborn.....	48	2	3.	1.7	1.	....	3.5	9.67
Defiance.....	D	1½	3.	1.74	1.	....	3.9	7.60
Defiance.....	E	2	3.	1.74	1.	....	3.9	9.10
DeKalb.....	E2	2	2.8	1.5	1.	....	3.7	8.50
DeKalb.....	E2½	2½	2.8	1.5	1.	....	3.7	9.33
Denby.....	12	1	3.2	1.78	1.	....	3.88	6.8
Denby.....	134	2	4.8	3.0	1.6	1.	6.5	8.85
Denby.....	25	3	4.8	3.0	1.6	1.	6.5	7.8
Denby.....	27	4	4.99	3.16	1.79	1.	5.78	9.00
Denby.....	210	5	4.99	3.16	1.79	1.	5.78	13.00
Dependable.....	E	2½	4.8	3.0	1.6	1.	6.5	....
Diamond T.....	FS	1½	3.66	1.91	1.	....	4.46	8.25
Diamond T.....	T	1½	3.66	1.91	1.	....	4.46	8.25

(To be continued next week.)

The Automotive Repair Shop

Practical Maintenance Hints

Use for Hacksaw Blades

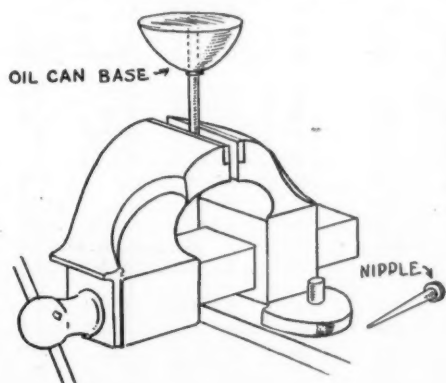
If an old blade is saved and the teeth ground out with an emery wheel, it will make a good tool for removing piston rings. The ring is spread as in the illustration and a hacksaw blade inserted. This blade is left there and a piece of another blade is run around the edge of the piston. Then the ring can be pulled off without cutting the fingers or without danger of breakage of the piston rings.

A Brake for the Countershaft

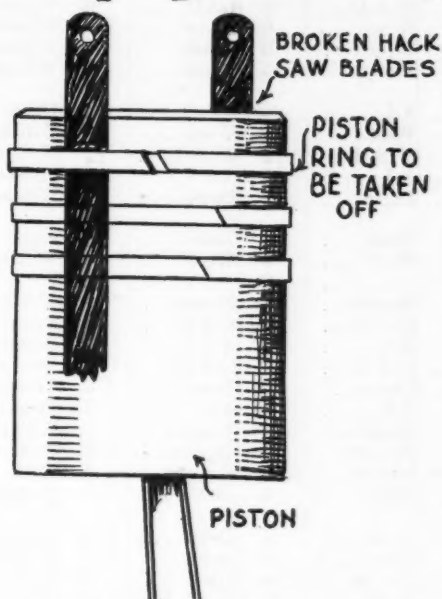
In common shop practice countershafts and similar power transmitters are allowed to revolve freely after the belt is thrown off, and many accidents have happened when workmen have tried to stop them with their bare hands. Here is a remedy: A short piece of fairly heavy leather belting or similar material is hung over the countershaft pulley so that the rotation of the pulley is the same as the belt pulled. A handle is attached to the belt. A pull on the belt is enough to stop the rotation of the countershaft. After being used for a while, should the belt start wearing, pieces of material can be attached to it in the same manner a new vee link is applied to a fan belt.

Making Special Oil Cans Out of Old Cans

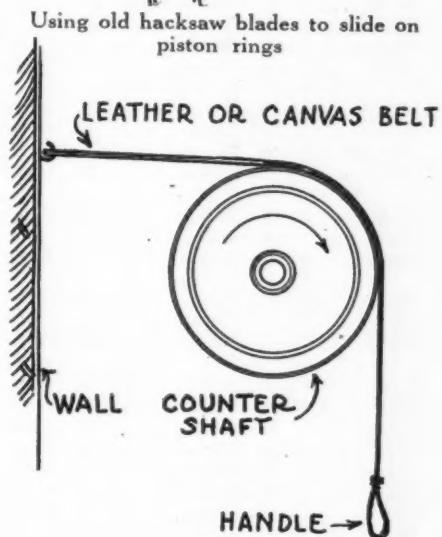
A short oil can can be made into a long one by sticking a piece of stiff wire into the nozzle. This makes a good oil can for places hard to get at. The oil will run down the wire. An oil can that has lost the spring in the bottom of the can (the base where the oil is forced from).



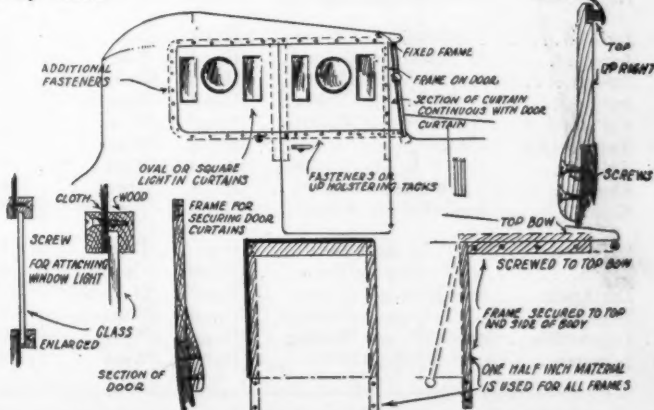
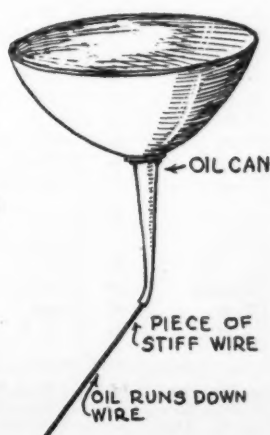
Above is shown a method of restoring the spring to the bottom of an oil can, and at right a method of increasing the reach of the oil can spout



Using old hacksaw blades to slide on piston rings



A brake for the countershaft to avoid accidents caused by attempting to stop them by hand



A snug arrangement of the curtains on a roadster can be obtained by the above suggestions

can be renovated by putting a piece of round wood in a vise and setting the can top downward (after removing the nibble), and twirling the can while bearing down on it.

Fitting the Roadster Top for Winter Weather

With the top of a roadster type of automobile a snug type of permanent curtain arrangement is obtainable by following the suggestions described and shown in the sketch.

This consists mainly of screwing two wooden uprights to each of the doors with a cross piece at the top for supporting the forward curtains and having these swing open with the doors for convenience in entering the car. At the forward upper edge of the top and at the rear edge of the door, two wooden frames are secured by screws, the upper one to the top bow and the side one joined to the upper and to the inside of the body.

The curtain to the rear of the door curtain is secured to this frame and to the back curtain. The curtain attaching to the windshield should either be continuous with the door curtain or sewed to this curtain, and in swinging the door the curtains merely bend acting as a hinge. The celluloid windows should be replaced with real glass obtainable in oval or square frames at reasonable prices or made with small moulding and screwed to the curtain fabric.

With these frames for the curtains practically all cold drafts in the car can be avoided and the inconvenience of unfastening side curtains is avoided. The frames need not be heavy, $\frac{1}{2}$ in. material being suitable and where the door frame meets the fixed frame a strip of felt will silence them and further exclude the draft.

Specifications of the Electrical Equipment Found on 1920 Passenger Cars

Make and Model	IGNITION			GENERATOR		MOTOR		BATTERY			Wiring System	Units Combined	FUSES		
	System	Make	Control	Make	Voltage	Make	Voltage	Make	Amp. Hr.	Voltage			Type	Volts	Amp.
Allen.....43	Single	Conn.	Hand	West	6	West	6	U. S. L.	90	6	1	GI.	GT.	6	15
American.....C	Single	Conn.	Hand	G & D	6	G & D	6	Willard	110	6	1	S.	3-A.	1.250	20
Anderson.....All	Single	Remy	Hand	Remy	6	Remy	6	Willard	90	6	1	S.			
Apperson.....All	Single	Remy	Hand	Bijur	6	Bijur	6-8	Willard	90	6	1	S.	Open.	1.250	10
Auburn.....6-39	Single	Remy	Hand	Remy	6	Remy	6	Willard	90	6	1	S.		6-8	25
Beggs.....20-T		Conn.	Hand	A-L.	6	A-L.	6	Exide	90	6	1	GT.	Cart.	6	15
Bour-Davis.....21	Single	West.	Hand	West.	6	West.	6	Willard	111	6	1	S.	GT.	6	15
Brewster.....	Single	Berling	Hand	U. S. L.	12	U. S. L.	12	U. S. L.			1				
Briscoe.....4-34	Single	Conn.	Hand	A-L.	6	A-L.	6	Prest-O-L.	80	6	1	GI.	GT.	6	20
Buick.....	Single	Delco.	Hand	Delco.	6	Delco.	6	Willard	132	6	1	S.			
Cadillac.....59	Single	Delco.	H. & A.	Delco.	6	Delco.	6	Exide	130	6	1	GM.			
Case.....V-20	Single	Delco.	H. & A.	West.	6	West.	6	Willard	111	6	1	GI.	5AGT.	50	
Chalmers.....35-C	Single		Hand		6		3		106	6	1	GI.	GT.	6	15-30
Champion.....KO	Single	Delco.	Hand	Dyneto.	6	Dyneto.	6	Willard	90	6	1	S.	GT.	6	200
Chandler.....All	Single	Bosch	Hand	G & D	6	G & D	6	Prest-O-L.	105	6	1	S.	GT.	6	
Chevrolet.....All	Single	Remy	Hand	A-L.	6	A-L.	6	Willard	111	6	1	GI.	GT.	6	
Cleveland.....40	Single	G & D	Hand	G & D	6	G & D	6	Prest-O-L.	94	6	1	S.	GT.	6	20
Cole.....All	Single	Delco.	H & A.	Delco.	6	Delco.	6	Prest-O-L.		6	1	S.			
Columbia.....All	Single	At-Kent.	Hand	A-L.	6	A-L.	6	Prest-O-L.	80	6	1	S.			
Comet.....C-53	Single	Wagner	Hand	Wagner	6	Wagner	6	Willard	111	6	1				
Commonwealth.....42	Single	At-Kent.	Hand	Dyneto.	6	Dyneto.	6	Prest-O-L.	105	6	1		GT.		
Crow-Elkhart.....L-55	Single	Conn.	Hand	Dyneto.	6	Dyneto.	6	Exide	120	6	1		Cart.	6	10
Cunningham.....V-4	Single	Delco.	H & A.	Delco.	6	Delco.	6	Willard	132	6	1				
Daniels.....8-D	Single	Delco.	H & A.	Delco.	6	Delco.	6	Willard	132	6	1	S.			
Davis.....51	Single	Delco.	Hand	Delco.	6	Delco.	6	Willard	90	6	1	S.			
Dixie Flyer.....	Single	Eisemann.	Hand	Dyneto.	6	Dyneto.	6	Willard	90		2				
Dodge Brothers.....	Single	Own.	H & A.	N. E.	12	North East	12	Willard	49	12	1	GM.	Encl.	1-50	10
Dorris.....6-80	Single	Bosch	Hand	West.	6	West.	6	Willard	102	6	1	S.	GT.	5-8	15
Dort.....15	Single	Conn.	Hand	West.	6	West.	6	U. S. L.	85	6	1	S.		6	10
du Pont.....A	Single	Eisemann.	H & A.	West.	6	West.	6	Exide	115	6	1	S.			
Economy.....6-46	Single	Own.	Hand	A-L.	6	A-L.	6	Willard	84	6					
Elcar.....All	Single	Delco.	Hand	Delco.	6	Delco.	6	Willard	90	6	1	S.	GT.	6-8	20
Elgin.....K	Single	Wagner	Hand	Wagner	6	Wagner	6	Willard	90	6	1		GT.	6-8	20
Essex.....A	Single	Delco.	H & A.	Delco.	7	Delco.	6	Exide	105	6	1	S.			
Ferris.....	Single	Splitdorf.	Hand	L-N.	6	L-N.	6	Willard	132	6	1	S.		6-8	
Ford.....T*	Single	Own.	Hand	Own.	6	Own.	6		80	6	1	S.			
Franklin.....9-B	Single	At-Kent.	Auto.	Dyneto.	12	Dyneto.		Willard	67	12	2	GM.	GT.	14	10
Gardner.....O	Single	West.	Hand	West.	6	West.	6	Willard	90	6	1	S.	GT.	6	20
Geronimo.....	Single	Delco.	Hand	Dyneto.	6	Dyneto.	6	Exide	90	6	1	S.	none	6	
Grant.....H	Single	At-Kent.	Hand	Bijur	6	Bijur	6	Prest-O-L.	90	6	1	S.	2GT.	6-8	15
Handley-Knight.....	Single	Conn.	Hand	A-L.	6	A-L.	6	U. S. L.	162.6	6	1	S.	GT.	6-8	20
Hanson.....54-A	Single	Delco.	Hand	Delco.	6	Delco.	6	Prest-O-L.	100	6	2				
Harroun.....	Single	Remy	Hand	Remy	6	Remy	6	Prest-O-L.	80	6	1				
Harvard.....All	Single	Bosch	Hand	Dyneto.	6	Dyneto.	6	Prest-O-L.	120	6	1	S.			
Hatfield.....A	Single	Conn.	Hand	Dyneto.	6	Dyneto.	6	Willard	111	6	1	GI.			
Haynes.....47	Single	Kingston.	Hand	Leece-N.	6	Leece-N.	6	Willard	132	6	1	GI.	GT.	6	5
H. C. S. Special.....		Delco.	Hand	Delco.		Delco.		Willard	111						
Hollier.....206-B	Single	West.	Hand	West.	6	West.	6	U. S. L.	80	6	1	S.	GT.	6	20
Holmes.....	Single	Eisemann.	Auto.	Dyneto.	12			Willard	69	12	2	S.	GT.	15	15
Hudson Super-Six.....	Single	Delco.	H & A.	Delco.	7	Delco.	7	Exide	105	6	1	GM.			
Huffman.....	Single	Conn.	Hand	Dyneto.	6	Dyneto.	6	Willard	90	6	1	S.		6	25
Hupmobile.....R	Single	At-Kent.	Hand	West.	6	West.	6	Willard	90	6	1	S.	Encl.	6	10
Jackson.....6-38	Single	Remy	Hand	A-L.	6	A-L.	6	U. S. L.	94	6	1	GI.	GT.	6-8	15
Jones.....All	Single	Remy	Hand	A-L.	6	A-L.	6	Prest-O-L.	120	6	1	GI.	GT.	6	20
Jordan.....F	Single	Delco.	Hand	Delco.	6	Delco.	6	Willard	90	6	1	S.	C. B.		
Jordan.....M	Single	Delco.	Hand	Delco.	6	Delco.	6	Willard	90	6	1	S.	C. B.		
Kenworthy.....4-80	Single	Bosch	Hand	Bijur	6	Bijur	6	Exide	140	6	1	S.		6	10
Kenworthy.....6-55	Single	Bosch	Hand	West.	6	West.	6	Exide	140	6	1	S.		6	10
King.....8	Single	At-Kent.	Hand	West.	6	West.	6	Prest-O-L.	120	6	1	S.	Cart.	6	10
Kissel.....All	Single	Remy	Hand	Remy	6	Remy	6	Willard	111	6	1	S.	3 A. G.	6	20
Kline.....6-55-J	Single	Conn.	Hand	Wagner	6	Wagner	6	Prest-O-L.	80	6	1	S.	5 A. G.	6	
LaFayette.....	Single	Delco.	H & A.	Delco.	6	Delco.	6	Exide	130	6	1	GM.	C. B.		
Leach.....Double		Delco.	Hand	Delco.	6	Delco.	6	Prest-O-L.	180	6	1	S.	Cart.	6	15
Lexington.....S-20	Single	Conn.	Hand	G & D	6	G & D	6	Willard	111	6	1		GT.	6	15-5
Liberty.....10-C	Single	Wagner	Hand	Wagner	6	Wagner	6	Prest-O-L.	90	6	1	GI.			
Locomobile.....48-6-7	Dual	Berling	Hand	West.	6	West.	6	Exide	150	6	1	S.	G. T.	6	10
Lorraine.....	Single	West.	Hand	West.	6	West.	6	U. S. L.	94	6	1	S.	GT.		

ABBREVIATIONS: *Starting and Lighting in closed models only. Ignition: At-K, Atwater-Kent; Conn., Connecticut; West, Westinghouse; Auto, Automatic; H & A, Hand and Automatic; S. A., Semi-Automatic. Generator: A-L, Auto-Lite; G & D, Gray & Davis; Leece-N, Leece-Neville; Ward-L, Ward-Leonard; N. E., North East; Split, Splitdorf. Motor: A-L, Auto-Lite; G & D, Gray & Davis; Leece-N, Leece-Neville; West, Westinghouse.

Giving Ignition, Starting, Lighting, Battery, Lamp, Spark Plug and Horn Data

LAMP CANDLEPOWER, VOLTAGE AND TYPE OF BASE										SPARK PLUGS			Horn	Make and Model	
Base Contact	HEADLIGHTS		SIDELIGHTS		TAILLIGHTS		DASHLIGHT		Make	Diam. Inches	Thread Pitch				
	Volts	CP.	Volts	CP.	Volts	CP.	Volts	CP.							
15	Single...	6-8	18	*6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Klaxon...	Allen...	43
20	Single...	6-8	15	*6-8	5	3-4	2	d3-4	2	Bethlehem...	7/8	18	Sparton...	American...	C
10	Single...	6-8	17			6-8	2	6-8	2	A. C.	7/8	18	E. A. L. ...	Anderson...	All
25	Double...	6-8	18	*6-8	4	d6-8	2	d6-8	2	A. C.	7/8	18	Sparton...	Apperson...	All
	Single...	6-8	15	*6-8	4	6-8	2	6-8	2	Rajah.....	7/8	18	E. A.	Auburn...	6-39
15	Single...	6-8	21	6-8	4	3-4	2	3-4	2	Champion...	7/8	18	Trojan...	Beggs...	20-T
15	Single...	6-8	21	6-8	5	6-8	2	6-8	2	A. C.	7/8	18	Trojan...	Bour-Davis...	21
	Single...	12	36	12	4	6-8	2	d6-8	2	Herz-Boug...	7/8	18	Klaxon...	Brewster...	
20	Single...	6-8	21			6-8	2	d6-8	2	Champion...	7/8	18	Sparton...	Briscoe...	4-34
	Single...	6-8	15	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Stewart...	Buick...	
	Single...	7	18	8	6	4	2	3-4	2	Titan.....	7/8	18	Delco....	Cadillac...	59
	Single...	6-8	21	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Case.....	V-20
5-30	Single...	6-8	15	6-8	4	6-8	2	6-8	2		7/8	18		Chalmers...	35-C
200	Single...	6-8	15			6-8	2	6-8	2	A. C.	7/8	18	Garford...	Champion...	KO
	Single...	6-8	15	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Chandler...	All
	Single...	6-8	21	6-8	4	6-8	2	d6-8	4	A. C.	7/8	18	Klaxon...	Chevrolet...	All
20	Single...	6-8	17	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Cleveland...	40
	Single...	6-8	21	*6-8	5	6-8	4	d6-8	5	A. C.	7/8	18	Sparton...	Cole.....	All
	Single...	6-8	15	*6-8	4	6-8	2	d6-8	2	Champion...	7/8	18	Schwarze...	Columbia...	All
	Single...	6-8	18			6-8	2	6-8	4	A. C.	7/8	18	Klaxon...	Comet.....	C-53
	Single...	6-8	21	6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	E. A. L. ...	Commonwealth...	42
10	Single...	6-8	15	6-8	4	6-8	2	d6-8	2	Champion...	7/8	18	E. A. Lab...	Crow-Elkhart...	L-55
	Single...	6-8	21	6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Sparton...	Cunningham...	V-4
	Single...	6-8	21	6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	Klaxon...	Daniels...	8-D
	Single...	6-8	21			6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Davis.....	51
	Double...	6-8	15			d3-4	2	d3-4	2	Champion...	7/8	18	Garford...	Dixie Flyer...	
10	Single...	12-16	15			12-16	2	12-16	2	A. C.	7/8	18	NorthEast	Dodge Brothers...	
15	Single...	6-8	21	6-8	4	6-8	2	6-8	2	Opt.....	7/8	18	Klaxon...	Dorris.....	
10	Single...	6-8	15			*6-8	2	d6-8	2	A. C.	7/8	18	Schwarze...	Dort.....	15
	Single...	6-8	21	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	du Pont...	A
	Single...	6-8	21	6-8	4	6-8	2	6-8	2	Champion...	7/8	18		Economy...	6-46
20	Single...	6-8	21	6-8	4	6-8	2	6-8	2	Champion...	7/8	18	E. A. L. ...	Elcar.....	All
20	Single...	6-8	21			6-8	2	6-8	2	Champion...	7/8	18	E. A. L. ...	Elgin.....	K
	Single...	6-8	15			3-4	2	*3-4	2	A. C.	18 m.m. 1.5 m.m.	18	Sparton...	Essex.....	A
	Single...	6-8	21	6-8	6	6-8	2	6-8	4	Champion...	7/8	18	Klaxon...	Ferris.....	
	Sgl.&Dbl.	6-8	17	6-8	2	6-8	2			Champion...	1/2	pipe	Own.....	Ford.....	T
10	Double...	12-16	15	*12-16	4	6-8	2	6-8	2	Opt.....	7/8	18	Klaxon...	Franklin...	9-B
20	Single...	6-8	15			6-8	2	6-8	2	Champion...	7/8	18	Trojan...	Gardner...	G
	Single...	6-8	21			6-8	2	6-8	2	Champion...	7/8	18	Trojan...	Geronimo...	
15	Single...	6-8	15	6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Trojan...	Grant.....	H
20	Single...	6-8	21	6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Sparton...	Handley-Knight...	
	Single...	6-8	15			6-8	3	6-8	3	Champion...	7/8	18	Schwarze...	Hanson.....	54-A
	Single...	6-8	15			3-4	2	d3-4	2	A. C.	7/8	18	Schwarze...	Harroun...	
	Double...	6-8	21	6-8	5	6-8	2	6-8	2	Bethlehem...	7/8	18	Klaxon...	Harvard...	All
	Single...	6-8	15	*4-8	4	6-8	4	6-8	2	A. C.	7/8	18	Ecco.....	Hatfield...	A
5	Single...	6-8	15	*6-8	12	6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Haynes...	47
20	Single...	6-8	15	6	4	3-4	2	3-4	2	A. C.	7/8	18	Sparton...	H. C. S. Special	
15	Double...	12-16	21			6-8	2	6-8	2	Bethlehem...	7/8	18	Sparton...	Hollier...	206-B
	Single...	6-8	15	6-8	4	3-4	2	*3-4	2	A. C.	7/8	18	Klaxon...	Holmes...	
25													Sparton...	Hudson Super Six...	
10	Single...	6-8	15			6-8	2	6-8	2	A. C.	7/8	18	Huffman...		
						6-8	2	6-8	2				Trojan...	Hupmobile...	R
15	Single...	6-8	15	6-8	4	3-4	2	3-4	2	A. C.	7/8	18	Stewart...	Jackson...	6-38
20	Double...	6-8	15	*6-8	4	s6-8	2	s6-8	2	Champion...	7/8	18	Newtone...	Jones.....	
	Single...	6-8	18	*6-8	4	6-8	3	6-8	3	A. C.	7/8	18	Sparton...	Jordan...	F
	Single...	6-8	18	6-8	4	6-8	3	6-8	3	A. C. & Rajah	7/8	18	Sparton...	Jordan...	M
10	Single...	6	50	6	30	6	2	6	2	Rajah.....	7/8	18	Sparton...	Kenworthy...	4-80
10	Single...	6-8	21	6		6-8	2	6-8	2	A. C.	7/8	18	Sparton...	Kenworthy...	6-55
10	Single...	6-8	15	*6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Sparton...	King.....	8
20	Double...	6-8	18			d6-8	2	d6-8	2	A. C.	7/8	18	Sparton...	Kissel...	
	Single...	6-8	15			6-8	2	d6-8	2	Champion...	7/8	18	Klaxon...	Kline.....	6-55-J
	Single...	6-8	21	6-8	4	3-4	2	3-4	2	A. C.	7/8	18	Klaxon...	LaFayette...	
15	Single...	6-8	32	6-8	5	6-8	2	6-8	2	Champion...	7/8	18	Klaxon...	Leach.....	
15-5	Single...	6-8	21	6-8	4	6-8	2	d6-8	4	Bethlehem...	7/8	18	E. A. L. ...	Lexington...	S-20
	Single...	6-8	15	*6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	United...	Liberty...	10-C
10	Single...	6-8	21	6-8	4	6-8	2	6-8	2	Titan.....	7/8	18	Klaxon...	Locomobile...	48-6-7
	Single...	6-8	17			6-8	2	6-8	2	A. C.	7/8	18	Schwarze...	Lorraine...	

Battery: Prest-O-Lite, Prest-O-Lite. Wiring system: GI, Generator and Ignition combined; GIM, Generator, Ignition, Motor combined; S, Generator, Motor Ignition separate; GM, Generator and Motor combined. Fuses: GT, Glass Tube; Cart, Cartridge; C. B., Circuit Breaker. Lamps: *Dashlights in series with taillights; headlight contains sidelight; d,—double contact; s,—single contact.

Specifications of the Electrical Equipment Found on 1920 Passenger Cars

Make and Model	IGNITION			GENERATOR		MOTOR	BATTERY				Wiring System	Units Combined	FUSES		
	System	Make	Control	Make	Voltage		Make	Voltage	Make	Amp. Hr.	Voltage		Type	Volts	Amperes
Maibohm	B Single	At-Kent	Hand	Bijur	6	Bijur	6	Willard	90	6	1	S	2-A	6	20
Marmion	34 Single	Delco	Auto	Delco	6	Delco	6	Willard	153	6	1	GI			
Maxwell	25 Single	At-Kent	Hand		6		6	Prest-O-L	87½	6	1	S	3A	6	20
McFarlan	127 Double	Opt	Hand	West	6	West	6	Willard	132	6	1	GI	5 A. G.	6	
Mercer	Ser. 5 Single	Eisemann	Hand	West	6	West	6	Willard	153	6	1	S	Cart		10
Meteor	KR Single	Simms	Hand	West	6	West	6	Willard	118	6	1	S	5 A. G.	6	10
Metz, Master Six	Single	Conn	Hand	West	6	West	6	Willard	111	6	1				
Mitchell	F-40 Single	Remy	Hand	Remy	6	Remy	6	Willard	90	6	1	GI	GT	6	10
Monitor	Single	Conn	Hand	Dyneto	6	Dyneto	6	Prest-O-L	110	6	1				
Moon	6-48 Single	Delco	Auto	Delco	6	Delco	6	Exide	120	6	1	S			
Moon	6-68 Single	Delco	Auto	Delco	6	Delco	6	Exide	120	6	1	S			
Moore	F Single	Conn	Hand	A-L	6	A-L	6	Willard	90	6	2				
Nash	Single	Wagner	H & A	Delco	6	Wagner	6	Willard	111	6	1	S			
National	Series BB Single	Delco	H & A	West	6	West	6	Prest-O-L	110	6	1	S	GT	6-8	
Nelson	D Single	Bosch	Hand	U. S. L.	12	U. S. L.	12	Willard	69	12	2	S	G	12	5-8
Noma	1-B Single	Delco	Hand	Delco	6	Delco	6	Willard	90	6					
Norwalk	4-30KS Single	Delco	Dyneto	6	Dyneto	6	Willard	80	6	1					
Oakland	34-B Single	Remy	Hand	Remy	6-8	Remy	6	Prest-O-L	100	6-8	1	GI			
Ogren	6-60 Single	Bosch	Hand	West	6	West	6	Willard	111	6	1		Cart	6	10
Oldsmobile	37-A Single	Remy	Hand	Remy	6	Remy	6	Willard	80	6	1				
Oldsmobile	45-B Single	Delco	H & A	Delco	6	Delco	6	Willard	90	6	1				
Olympian	45 Single	Conn	Hand	A-L	6	A-L	6	U. S. L.		6					
Overland	4 Single	Conn	Hand	A-L	6-8	A-L	6	U. S. L.	80	6-8	1	GI	Glass	6	20
Packard Single Six	Single	Delco	H & A	At-Kent	6	At-Kent	6			6-8		S		6	
Packard Twin Six	Single	Delco	H & A	Bijur	6	Bijur	6	Willard	134	6	1	S	GT	6	10
Paige	All Single	At-Kent	H & A	G & D	6	G & D	6	Willard	111	6	1	S	G	6	20
Pan-American	All Single	West	Hand	West	6	West	6	Willard	111	6	1	S	G	6	
Paterson	6-50 Dual	Delco	Hand	Delco	6	Delco	6	Willard	90	6	1				
Peerless	Ser. 6 Single	At-Kent	H & A	A-L	6	A-L	6	Willard	125	6	1		GT	6	10
Piedmont	4-30 Single	Delco	Hand	Dyneto	6	Dyneto	6	Willard	90	6	1	S			
Piedmont	6-40 Single	Remy	Hand	Remy	6	Remy	6	Willard	90	6	1	S			
Pierce-Arrow	38&48 Double	Delco	H & A	West	6-8	West	6	Willard	153	6	1	S	GT	6-8	10
Pilot	6-45 Dual	Delco	Hand	Delco	6	Delco	6	Prest-O-L	80	6	1	GI			
Porter	46 Dual	Berling	Hand	West	12	West	12	Prest-O-L	118	12	1	S	Cart	12	15
Premier	6-D Single	Delco	Hand	Delco	6	Delco	6	Willard	111	6	1	S			
Premo Car, 4-30&6-40	Conn			Dyneto	6	Dyneto	6	Willard		6	1				
Ranger	A Single	Conn	Hand	Bijur	6	Bijur	6	U. S. L.	80	6	1	S	GT	6	10
Reo	T & U Single	Remy	Hand	Remy	6	Remy	6	Willard	111	6	2	GI	Wire	6	10
Reo	T 6& U6 Single	North East	Hand	North East	6	North East	6	Willard	111	6	1	S	Wire	6	6
Revere	Single	Bosch	Hand	West	6	West	6	Willard	153	6	1	S	GT	6	15
Roamer	6-54E Single	Bosch	Hand	Bijur	6	Bijur	6	Columbia	117	6	1	S	3A	6	15
Roamer	4-75E Single	Bosch	Hand	West	6	West	6	Columbia	117	6	1	S	5 A. G.	6	15
R & V Knight	J & R Single	Wagner	Hand	Wagner	6	Wagner	6	Willard	111	6	1	S	Cart	250	20
Saxon	125 Single	Remy	Hand	Wagner	6	Wagner	6	Prest-O-L	80	6	1	S	Cart	6-8	15
Sayers	C.P. Single	Delco	Hand	Delco	6	Delco	6	Willard	90	6	1	GI	C.B.		
Scripps-Booth	B Single	Remy	Hand	Remy	6	Remy	6	Prest-O-L	85	6	1	GI	GT	6	20
Seneca	L Single	Conn	Hand	Allis Chalm	6	Allis Chalm	6	Prest-O-L	88	6	1	GM			
Severin	H Single	Wagner	Hand	Wagner	6	Wagner	6	Campbell	110	6	1	None	Cart	6	10
Singer	20 Single	Philbrin	Hand	West	6-8	West	6	Willard	153	6	1	S	G. C.	6	15
Skelton	35 Single	Conn	Hand	West	6	West	6	Prest-O-L	85	6	1	S		6	10
Spacke	S-20														
Standard	8-1 Double	Dixie	Hand	West	6	West	6	Willard	153	6	1	S.W.	2-A	6	15
Stanley	735														
Stanwood	A Single	At-Kent	Hand	West	6	West	6	Willard	90	6	1	G	Cart	6	20
Stearns	SKL-4 Single	At-Kent	Hand	West	12	West	12	Willard	153	6	1	S	Cart	6	10
Stephens	80 Single	Conn	Hand	A-L	6	A-L	6	U. S. L.	69	12	1	S	Cart	12	20
Stevens-Duryea	E Double	Berling	Hand	West	6-8	West	6-8	U. S. L.	116	6	1	S	Cart	6	20
Studebaker	All Single	Wagner	Hand	Wagner	6	Wagner	6	Vester	120	6-8	1	S	Cart	6	15
Stutz	H Double		Hand	Remy	6	Remy	6	Willard	111	6-8	1	S	Cart	6	10
Templar	445 Single	Simms	Hand	Bijur	6	Bijur	6	Willard	132	12	1				
Texan	B-38&A-38 Single	Conn	Hand	Bijur	6	Bijur	6	Prest-O-L	100	6	1	S	Cart	6	20
Tulsa	E-1,2,3 Single	Conn	Hand	Dyneto	6	Dyneto	6	Prest-O-L	80	6	1	S	Cart	6	20
								Exide	90	6	1	S	GT	6	15
Velie	34 Single	At-Kent	S. A.	West	6	West	6	Willard	108	6	1	S	Wire		15
Velie	48 Single	At-Kent	S. A.	Bijur	6	Bijur	6	Willard	111	6	1	S	Wire		15
Vogue	6-55 & 6-66 Single	Conn	Hand	A-L	6	A-L	6	Willard	111	6	1		Cart	1-250	15
Wasp	Single	Bosch	Hand	West	6	West	6	Exide	135	6	1	S	Cart	6	20
Westcott	C-38&C-48 Single	Delco	H & A	Delco	6	Delco	6	Willard	111	6	1	S	CB		
Willys-Knight	20 Single	Conn	Hand	A-L	6-8	A-L	6	U. S. L.	170	6	1	GI	GT	6	20
Winton Six	24 Single	Bosch	Hand	Bijur	6	Bijur	6	Willard	132	6		S	GT	6	15
Winton Six	25 Single	Bosch	Hand	Bijur	6	Bijur	6	Willard	125	6	1	S	CB		
Winther	61 Single	West	Hand	West	6	West	6	Willard	111	6		S	GI	6	10

ABBREVIATIONS: *Starting and Lighting in closed models only. Ignition: At-K, Atwater-Kent; Conn., Connecticut; West, Westinghouse; Auto, Automatic; H & A, Hand and Automatic; S. A., Semi-Automatic. Generator: A-L, Auto-Lite; G & D, Gray & Davis; Leece-N, Leece-Neville; Ward-L, Ward-Leonard; N. E., North East; Split, Splitdorf. Motor: A-L, Auto-Lite; G & D, Gray & Davis; Leece-N, Leece-Neville; West, Westinghouse.

Giving Ignition, Starting, Lighting, Battery, Lamp, Spark Plug and Horn Data

LAMP CANDLEPOWER, VOLTAGE AND TYPE OF BASE									SPARK PLUGS			Horn	Make and Model
Base Contact	HEADLIGHTS		SIDELIGHTS		TAILLIGHTS		DASHLIGHT		Make	Diam. Inches	Thread Pitch		
	Volts	CP.	Volts	CP.	Volts	CP.	Volts	CP.					
Single...	6-8	20	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Schwarze	Maibohm.....B
Single...	6-8	27	*6-8	8	6-8	2	6-8	2	A. C.	7/8	18	Sparton	Marmon.....34
Single...	6-8	15			6-8	2	6-8	2	Champion	7/8	18	Schwarze	Maxwell.....25
Single...	6-8	21	*6-8	12	6-8	2	d6-8	2	A. C.	7/8	18	Klaxon	McFarlan.....127
Single...	6-8	20	6-8	5	6-8	2	6-8	4	Champion	7/8	18	Sparton	Mercer.....Ser. 5
Single...	6-8		6-8		6-8		6-8		A. C.	7/8	18	Meteor	K R
Single...	6-8	16	6-8	4	6-8	2	6-8	2	Champion	7/8	18	Trojan	Metz, Master Six
Single...	6-8	21	6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	Sparton	Mitchell.....F-40
									Champion	7/8	18	Klaxon	Monitor
Single...	6-8	20			6-8	2	d6-8	2	Champion	7/8	18	Klaxon	Moon.....6-48
Single...	6-8	20			6-8	2	d6-8	2	Champion	7/8	18	Klaxon	Moon.....6-68
Single...	6	20	6-8		6-8	2			Champion	7/8	18	Garford	Moore.....F
Single...	6-8	15	6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	Trojan	Nash
Single...	6-8	20	*6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Sparton	National.....Series BB
Double...	12-16	15	12-16	4	12-16	2	12-16	2	Champion	18 m.m.		Schwarze	Nelson.....D
Single...	6-8				6-8		d6-8						Noma.....1-B
Single...	6-8	17			6	2	6	2	Champion	7/8	8	Stewart	Norwalk.....4-30. KS
Single...	6-8	15			6-8	2	6-8	2	A. C.	7/8	18	Schwarze	Oakland.....34-B
Single...	6	32	6		6	4	6	4	Champion	7/8	18	Klaxon	Ogren.....6-60
Single...	6-8	15	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Oldsmobile.....37-A
Single...	6-8	15	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Oldsmobile.....45-B
									Champion			E. A. Lab.	Olympian.....45
Single...	6-8	16			3-4	2	*3-4	2	Champion	1 1/2		A. L.	Overland.....4
Single...	6-8		6-8	4	6-8	2	6-8	2		7/8	18		Packard Single Six
Single...	6-8	21	*6-8	4	6-8	2	6-8	4	A. C.	7/8	18	Sparton	Packard Twin Six
Single...	6-8	17	6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	Trojan	Paige.....All
Single...	6-8	32			6-8	2	*3-4	4	A. C.	7/8	18	E. A. Lab.	Pan-American.....All
Single...	6-8	15	6-8	4	6-8	2	6-8	2	A. C.	7/8		E. A. Lab.	Paterson.....6-50
Single...	6-8	21	6-8	4	6-8	2	6-8	2	Champion	7/8	18	Sparton	Peerless.....Ser. 6
Single...	6-8	12			6	2	6	2	Champion	7/8	18	Klaxon	Piedmont.....4-30
Single...	6-8	12			6	2	6	2	Champion	7/8	18	Klaxon	Piedmont.....6-40
Single...	6-8	20			6-8	5	6-8	5	A. C.	7/8	18	Klaxon	Pierce-Arrow...38&48
Single...	6-8	15			6-8	2	6-8	2	A. C.	7/8	18	Schwarze	Pilot.....6-45
Single...	12-16	20	12-16	4	12-16	4	12-16	2	A. C.	7/8	18	Stewart	Porter.....46
Double...	6-8	21	*6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	Klaxon	Premier.....6
									Bethlehem	7/8	18	Klaxon	Premo Car, 4-30&6-40
Single...	6-8	15	6-8	4	6-8	2	6-9	2	Champion	7/8	18	Stewart	Ranger.....A
Double...	7	15			3-4	2	*3-4	2	A. C.	1 1/2	18	Trojan	Reo.....T & U
Single...	7	15			6	2	6	2	A. C.	1 1/2	18	North East	Reo.....T6 & U6
Single...	6-8	20	*6-8	8	6-8	4	6-8	4	Optional	7/8	18	Klaxon	Revere
Single...	6-8	15	6-8	8	6-8	2	6-8	2	A. C.	7/8	18	Sparton	Roamer.....6-54E
Single...	6-8	15	6-8	8	6-8	2	6-8	2	A. C.	7/8	18	Sparton	Roamer.....4-75E
Single...	6-8	15	6-8	4	6-8	2	d6-8	4	A. C.	7/8	18	Klaxon	R & V Knight. J. & R.
Single...	6-8	15			6-8	2	6-8	2	A. C.	7/8	18	Trojan	Saxon.....125
Single...	6-8	15			6-8	2	d6-8	2	Champion	7/8	18	Stewart	Sayers.....C. P.
Single...	6-8	18			6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Scripps-Booth...B
Single...	6-8	15	6-8	2	6-8	2	d6-8	2	Champion	7/8	18	Klaxon	Seneca.....L
Double...	6	17	6	5	6	2	6	2	Champion	7/8	18	Klaxon	Severin.....H
Single...	6-8	15			6-8	2	d6-8	2	A. C.	7/8	18	Klaxon	Singer.....20
Single...	6	18			6	2	6	2	Bethlehem	7/8	18	Klaxon	Skelton.....35
												Spaeke	S-20
Single...	6-8	21	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Standard.....8-I
Double...	6-8	21	6-8	4	6-8	2	6-8	2				Klaxon	Stanley.....735
Single...	6	17	6	10	6	7	6-8	2	A. C.	1 1/8	18	Klaxon	Stanwood.....A
Single...	12-16	21	*12-16	4	12-16	2	12-16	2	A. C.	7/8	18	B. & A. Lab.	Stearns.....SKL-4
Single...	6-8	15	6-8	2	6-8	2	6-8	2	Champion	7/8	18	Klaxon	Stephens.....80
Single...	6-8	21	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Stevens-Duryea...E
Single...	6-8	12			6-8	2	6-8	2	Champion	1 1/2		Sparton	Studebaker.....All
Double...	6-8	15	*6-8	4	6-8	2	6-8	2	A. C.			Klaxon	Stutz.....H
Single...	6-8	21	*6-8	4	6-8	2	6-8	2	Champion	7/8		Klaxon	Templar.....445
Single...	6	16			6	2	6-8	2	A. C.	7/8	18	Klaxon	Texan.....B38&A38
Single...	6-8	21	6-8	2	6-8	2	d6-8	2	Champion	7/8	18	Trojan	Tulsa.....E-1,2,3
Single...	6-8	15	6-8	4	6-8	2	d6-8	2	Champion	7/8	18	E. A. Lab.	Velie.....34
Single...	6-8	15	6-8	4	6-8	4	d6-8	4	Champion	7/8	18	Sparton	Velie.....48
Single...	6-8	21	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Vogue.....6-55 & 6-66
Single...													Wasp
Single...	6-8	18	*6-8	4	3-4	2	d3-4	2	A. C.	7/8	18	Klaxon	Westcott.....C-38&C-48
Single...	6-8	30			3-4	2	*3-4	2	Champion			Sparton	Willys-Knight...20
Single...	6-8	21	6-8	6	6-8	2	6-8	2	Champion	7/8	18	American	Winton Six.....24
Single...	6-8	21	6-8	6	6-8	2	6-8	2	Champion	7/8	18	Electric	Winton Six.....25
Single...	6	18			6	4	6	2	A. C.	7/8	18	Klaxon	Winther.....61

Battery: Prest-O-Lite, Prest-O-Lite. Wiring system: GI, Generator and Ignition combined; GIM, Generator, Ignition, Motor combined; S, Generator, Motor Ignition separate; GM, Generator and Motor combined. Fuses: GT, Glass Tube; Cart, Cartridge; C. B., Circuit Breaker. Lamps: *Dashlights in series with taillights; headlight contains sidelight; d,—double contact; s,—single contact.

From the Four Winds

Glimpses at the World of Motordom

COMING MOTOR EVENTS

Automobile Shows

New York	Automobile Salon	Nov. 14-21
Chicago	Automotive Equipment Show	Nov. 15-20
Jersey City, N. J.	Annual Automobile Show	Nov. 15-20
Jacksonville, Fla.	Annual Automobile Show	Nov. 18-27
Houston, Texas	Automobile Show	Nov. 20-28
Los Angeles, Cal.	Automobile Show	Dec. 11-20
Akron, Ohio	Automobile Show	Dec. 25-Jan. 2, 1921
Los Angeles, Cal.	Motor Show	Jan. 7, 1921
New York	National Passenger Car Show	Jan. 8-14, 1921
Milwaukee	Annual Winter Show	Jan. 14-21, 1921
Schenectady, N. Y.	Annual Automobile Show	Jan. 16-22, 1921
Cleveland	Annual Automobile Show	Jan. 22-29, 1921
Montreal	Nat'l Motor Show of Eastern Canada	Jan. 22-29, 1921
Amsterdam, N. Y.	Annual Automobile Show	Jan. 23-29, 1921
Chicago	National Passenger Car Show	Jan. 29-Feb. 5, 1921
Hudson, N. Y.	Annual Automobile Show	Jan. 30-Feb. 5, 1921
Minneapolis	Winter Show	Feb. 5-12, 1921
Newberg, N. Y.	Annual Automobile Show	Feb. 12, 1921
Kansas City, Mo.	Annual Automobile Show	Feb. 12-19, 1921
Fitchburg, Mass.	Automobile Show	Feb. 12-19, 1921
Pittsfield, Mass.	Annual Automobile Show	Feb. 20-26, 1921
Deadwood, S. D.	Annual Automobile Show	Feb. 21-26, 1921
Des Moines	Annual Automobile Show	Mar. 2-10, 1921
Torrington, Conn.	Annual Automobile Show	Mar. 20-26, 1921
Gloversville, N. Y.	Annual Automobile Show	Apr. 3-9, 1921

Tractor Shows

Columbus, Ohio	National Tractor Show	Feb. 6-12, 1921
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Foreign Shows

Christchurch, N. Z.	Passenger Car Show, Olympia	Nov. 4-13
Brussels	Olympia Motor Exhibition	Nov. 6-13
Sydney, Australia	Automobile Show	Dec. 10
London	National Tractor Show	Feb. 6-12, 1921

Conventions

Chicago	Automotive Equipment Assn.	Nov. 15-20
Detroit, Mich.	Natl. Assn. of Motor Truck Sales Managers, Annual Meeting	Nov. 18-19
Cincinnati	Ohio Automobile Trade Assn. Fourth Annual Convention	Dec. 8-10
Cedar Rapids, Iowa	Iowa Motor Trades Bureau	Dec. 8-9
Cincinnati	Annual Convention Ohio Automobile Jobbers' Assn.	Dec. 8-9
Columbia, S. C.	Annual Meeting South Carolina Automotive Trade Assn.	Dec. 9-10
Milwaukee	Wisconsin Automotive Dealers' Assn.	Jan. 19, 1921
Chicago	N. A. D. A. Annual Meeting	Jan. 31-Feb. 1, 1921
Chicago	Automotive Electric Service Association	Feb. 2-4, 1921

Races

Los Angeles	Thanksgiving Day Speedway Classic, Beverly Hills Speedway	Nov. 25, 1920
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Business Notes

The Liberty Manufacturing Co. has been incorporated with \$3,000,000 common stock at Stratford, Conn., to manufacture the Cameron air cooled engine for automobiles, trucks and tractors. Tests are being made of an exceptionally light weight car with a wheelbase of 105 in., which it is expected will be manufactured shortly.

Republic Motor Truck Co., Alma, Mich., reports production of 100 trucks a month and sales running in the neighborhood of 200 a month, thereby reducing the large stock of finished trucks on hand when the slump in demand began.

The Moto-Meter Co., Inc., of Long Island City, N. Y., has established a Canadian factory for the manufacture of their product in Hamilton, Ontario. The company is one of the first exclusive automobile accessory manufacturers to establish a Canadian factory. Samuel E. Ryder, who for the past few years has been connected with the Detroit branch as equipment engineer, has been placed there as general manager.

The Perfectfix Rubber Co. of Milwaukee, Wis., has been incorporated to manufacture and wholesale rubber cement, repair kits, etc.

The Classy Auto Deflector & Supply Co. of Milwaukee, has been incorporated to engage in the manufacture of headlight lenses and other automotive equipment.

Morse Chain Co., Ithaca, N. Y., manufacturers of rocker joint silent chains used for power transmission, has established a Detroit branch factory devoted exclusively to the manufacture of silent chain sprockets and the Morse adjustment.

The Battery Equipment & Supply Co. has leased the entire floors of 1458 and 1460 Michigan Boulevard, Chicago, and will move to this address about Nov. 10. J. Taylor, formerly of the Battery Moulds Mfg. Co., has been appointed factory superintendent.

The Hammered Piston Ring Co., Baltimore, announces the appointment of C. F. Hockley as president with Howard Bruce, chairman of the board of directors, and A. C. Bruce as vice-president.

The Kardell Tractor & Truck Co., St. Louis, has increased its capital stock from one to three million dollars for the purpose of installing additional manufacturing equipment and to take care of a largely increasing output of tractors.

The Graver Corp. of East Chicago, Ind., manufacturers of steel tanks and general plate construction, oil refinery equipment, water softening and purifying equipment, have opened the following branch offices: New York City, 280 Broadway; Pittsburgh, 62 Conestoga Building; Kansas City, Mo., 1001 Gloyd Building; Cincinnati, 220 Gwynne Building; Toledo, 314 Nicholas Building; San Francisco, 312 Balboa Building.

The Goodluck Rubber Co. of Buffalo has arranged to purchase the rights to manufacture the Climax tubes and Maxo tires in New York state. The Climax Rubber Co. recently acquired a plant at Delaware which will be used in manufacturing the Maxo tires.

R. S. McLaughlin, president of General Motors of Canada, Ltd., and W. T. Sampson, president of Gananoque Spring & Axle Co., Ltd., were elected president and vice-president, respectively, of the Automotive Industries of Canada (the National Automobile Chamber of Commerce of the Dominion) at the annual meeting of the association held in Toronto.

The She-Boy Rubber Co. has been organized by Milwaukee and Sheboygan, Wis., capital to manufacture tires, retreads and rubber goods generally. It is capitalized at \$675,000. A plant is being rebuilt and enlarged at Sheboygan, to be ready March 1. The executive offices of the company will be in Milwaukee.

The Walden W. Shaw Corp., operating the Yellow Cab taxicab service and the Yellow Cab Manufacturing Co., in its plan for segregating the two branches proposes two classes of stock, one consisting of 6750 shares of \$100 par value to be held by the Shaw corporation and the other consisting of 50,000 shares of \$10 par value to be distributed among the Shaw stockholders.

Variable Wing Surface Permits Low Speeds



Paris, Nov. 11—An airplane with variable wing surface, capable of starting and landing at low speeds and of flying at high velocities has been produced by Engineer Levavassor and, undoubtedly, will win the French prize for the best device for making flying safe. The new Levavassor biplane has a wing with a fixed central portion and two additional surfaces, one of which can slide under and the other over the main surface. For starting and landing these additional surfaces are pushed respectively forward and rearward, thus considerably extending the chord of the wing. When in the air the two surfaces are brought respectively under and over the wing, thus reducing the bearing surface. In the experiments no difficulty was experienced in varying the wing surface while in flight, with the result that the plane attained a speed of 90 miles an hour in full flight and landed at 30 miles an hour.